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PRACTICAL PROBLEMS IN OTOTOLOGY AND RHINOLOGY.*

BY DUNDAS GRANT, M. A., M. D., F. R. C. S., LONDON, ENGLAND.

I should be proud to place before you a piece of original investigation containing some epochal addition to the sum of human knowledge, or at least of that section of it with which we are particularly occupied. Such, however, I am unable to do, as, from circumstances, and perhaps from temperament, I have been led to enroll myself as a simple healer of the sick. My inquiries have always been conducted in the light of practical pursuits, and if there is one thing on which I think I may congratulate myself more than another it is the possession of a frame of mind which enables me to extract the greatest amount of benefit (duly acknowledged) from the work of others, instead of racking my brains to find means of criticising and depreciating it. How often have I seen the critical frame of mind deprive its possessor of much of the good he might otherwise have derived.

My initiation into otology dates from thirty years ago, when my valued friend and relative, Mr. Laidlaw Purves, indoctrinated me in the practice and principles of the specialty and inspired in me an interest in this branch of the medical art which I venture to think I still retain and hope never to lose. As the successor to Hinton in the great school of Guy's Hospital, he maintained the best traditions of British Otology as established by Toynbee, enhanced by a familiarity with the advances in the art as developed and practised in Continental schools, notably in Vienna, where Grüber and Politzer were the chief exponents. Grüber is now no more, but Politzer, in spite of the length of his active career, is still as recep-

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tive and appreciative of new ideas as ever and bids fair to continue long an example of industry and enthusiasm which we may well emulate and strive to imitate.

At that time the ear was mainly studied in relation to its main function, that of hearing, and the surgical developments of otology, with which we are now so familiar, were scarcely dreamt of. I cannot help thinking that the progress in this direction has dazzled the otological eye by its brilliancy and diverted from the less sensational problems of what I may call acoustic otology, the attention they have deserved. It cannot be said that in this department the progress has been at all in proportion to that in the surgical.

Far be it from me, however, to say that we have remained at the stage where cases which failed to respond to the syringe or to the air-douche were considered hopeless, but the advance beyond it has not been so considerable as could be wished.

THE VALUE OF TUNING-FORK TESTS.

At the commencement of the period I have mentioned the functional examination of the ear was by no means neglected. Tuning-fork tests were studied by Lucaë, Schwabach and other otologists, and Hartmann devised his well-known conventional graphic representations, but I think it will be generally agreed that the fullest development was only attained by the laborious investigations of Professor Bezold of Munich, for the results of which he is entitled to our warmest gratitude. Ostmann and Gradenigo have been among the other most diligent developers of this method of testing, at a great expense of time and labor. Possibly there has been a tendency to overestimate the value of these tests, especially when we consider their subjective nature and the "personal equation" of such untrained observers as the patients on whose statements we have to depend. On the other hand, it is surprising to read the statement by the surgeon in charge of the aural department of a metropolitan medical school that he has quite given up tuning-fork tests. Jacobson, late of Berlin, now, unfortunately, deceased, has certainly exposed them to the most destructive criticism, but has in the description of his practice shown himself unable to dispense with them. As usual, the truth lies in the middle, and we must realize the limitations of the tuning-fork tests, not reject them. Care must be taken both in observation and interpretation.

In the first instance we must only accept results which are well marked. Bing suggests that no difference of less than two seconds from normal duration should receive consideration. This applies

especially to the measurement of hearing by bone-conduction. Again, it is well to repeat the tests several times, exercising considerable skepticism if they vary to any great extent.

Forks of very high or very low pitch are ill adapted for tests connected with bone-conduction. Very high-pitched forks are apt to be heard by the opposite ear by air-conduction, in spite of our closing it up, thus rendering the testing of the ear under investigation very unreliable. For Weber's vertex test they are, therefore, ineligible. Low pitched forks are of such weight and magnitude that the patient may feel the mechanical vibrations after he ceases to hear the sonorous ones and thereby be led into error in reporting. The ideal fork for bone-conduction in general and especially for such tests as Rinne's and Weber's is Gardiner Browne's, tuned to c, with 256 vibrations per second. It should be heard by a young adult for about 15 seconds through the bone and for about a further 15 opposite the meatus. This "acro-osseal difference" is an important item which should not be omitted in the description of a tuning-fork. The duration should be long enough to allow of a good margin for observation and it should not be so long as to induce phenomena of exhaustion in a normal person.

Having been born in the year in which Rinne's test saw the light (the one in which Garcia invented his laryngoscope), I take the test somewhat to heart. I consider its evidence, especially when "positive," as indispensable, but would remind you of an obvious fallacy into which I and many others have been led by it and which in many text-books receives no notice. This is that in unilateral nerve-deafness we get a "negative Rinne" because we are comparing the air-conduction of the diseased side with the bone-conduction of the sound one, the vibrations of the tuning-fork on the mastoid being conveyed through the cranial bones to the opposite ear. Here we have to check our results by means of the vertex test and the Galton whistle in a way I need not here recount.

I think I have said enough to show that the results of our tuning-fork tests must not be blindly accepted, but must be interpreted in the light of their limitations. Moreover, we must take them in combination with other signs. We must not rely on them alone any more than we would rely on any other single method of examination of any organ of the body.

For the production of pure tones we have no more convenient instrument than the tuning fork, and in some form or other the graphic method of recording the field of audition, for which we are

primarily indebted to Hartmann, will never be dismissed from employment even though submitted to modification in some directions. Probably it will advisably be confined to air-conduction, and the number of octaves may, by the use of nine instead of five tuning-forks, be increased to eight with advantage. The amount of time required may be considered sufficient to render it impracticable for general use, but this pales into insignificance beside Professor Bezold's monumental "*continuierliche Tonreihe*." I may remind you that to facilitate calculation and to save time I have devised and described a method by which the percentage duration of hearing for nine forks can be taken for both ears in less than twenty minutes, not merely by an aurist, but by any assistant possessed of normal hearing and conscientiousness.¹

To convert this percentage of duration of hearing into percentage of actual hearing power is a problem which is certainly of great interest and probably of great practical value. Undoubtedly as a step in the direction of scientific righteousness it merits our careful attention. In the mere testing with the watch or the voice we ought, if we are to be accurate in our measurement of the patient's acuity of hearing, to allow for the fact that sound diminishes as the square of the distance. To grasp and apply this comparatively simple rule would disconcert many of us; how much greater is the difficulty in calculating the percentages of hearing by the tuning-fork when we remember that the tone dies away by logarithmic decrements with a factor peculiar to each individual tuning-fork. Bezold, by adopting a rule of Edelmann's assuming that the decrement of all tuning-forks was the same, calculated out a very near approximation to the desired result. Schmiegelow adopted the method of measuring the distance at which the fork under investigation was heard at the end of the different periods of duration. Ostmann's method is in a way an extension of Gradenigo's, being founded on the principle that the visible and calculable amplitude of vibration is an index of the intensity of the sound. Gradenigo makes them exactly proportional, but in reality the intensity varies as the square of the amplitude. My friend, Dr. Womack, investigated for me the set of forks I use, employing the microscopical method for finding the constant factor peculiar to each of the lower forks and the distance method for the higher ones. He has prepared for me charts which show for the nine forks the relation borne by the percentage duration to the percentage auditory acuity. It will be seen that the divergence is greatest at the middle of the duration, 50 per cent. of duration in case of a tuning-fork of medium pitch being equivalent to only about 15 per cent. of normal auditory power.

How far this correction of the charts with which we have so long been familiar will lead us to greater accuracy in diagnosis is quite uncertain, and for the present Hartmann's claim to our gratitude is certainly indisputable.

· DIAGNOSTIC VALUE OF TESTS FOR HIGHEST PITCHED TONES.

It is pretty generally accepted that loss of hearing for the highest pitched tones is characteristic of and, indeed, almost pathognomonic of disease of the labyrinth, we may almost say of the lowest turn of the cochlea. The tympanic apparatus is mainly required for the conduction of the comparatively slow vibrations of the lower pitched tones, and in spite of it being diseased or at least fixed, the highest pitched tones are heard. If, with evidence of disease of the conducting apparatus, the hearing for the highest pitched tones is defective or lost, we assume that there is simultaneous labyrinthine disease.

If our tests exclude disease of the conducting apparatus any deafness present must be attributed to disease of the auditory nerve in its labyrinthine expansion, its trunk, its cortical center or the fibers of communication between the nerve and this center. If the deafness is, under these circumstances, most marked for the highest tones, the affection is most probably situated in the cochlea. Should, however, the defect of hearing be equal or more pronounced for deep tones, the portion of the auditory nervous apparatus concerned is more probably some part other than the labyrinth, possibly the cortical centre.

What is the foundation for this view?

Gradenigo,² in Schwartz's handbook, asserts it as well established by his experiments and observations, and Politzer³ quotes Gradenigo directly. The typical defect for high tones is shown in most of our charts of hereditary syphilitic disease known usually to affect the labyrinth. On the other hand, in Siebenmann's⁴ case of central disturbance of hearing depending upon a lesion of the crural tegumentum, the perception of the lower tones was the first affected, later the perception of all tones being equally diminished. In Gradenigo's⁵ cases of lesion of the auditory nerve-trunk, the tones in the middle of the range were the worst heard.

I have ventured to lean on these results and to assume as a practical rule that in cases of nerve-deafness in which the defect is not most pronounced for the highest pitched tones, but for all tones in pretty equal proportion and perhaps even more for the lower tones, the affection is probably one of the auditory center rather than the

labyrinth or nerve-trunk. If, further, there is no evidence of an organic lesion of the other cranial nerves or central nervous system, there is a reasonable probability that the affection is a functional one and the prognosis is *ceteris paribus* more favorable. I have applied this principle in numerous instances, as in neo-marital and tobacco forms of nerve-deafness. Two most striking cases, one of hysterical deafness, and one of neurasthenic dulness of hearing, I published in the *Journal of Laryngology*. In the former⁶ the hearing, which suddenly returned, had been so genuinely extinguished that the patient spontaneously acquired the art of lip-reading. In the latter⁷ a little more generosity in diet, stimulants and rest and greater economy of labor and of conscientiousness resulted in recovery.

In regard to lengthened bone-conduction may I state a conviction that this is produced by increased tension in the conducting apparatus, not by simple obstruction, as I have found it practically absent in cases of uncomplicated ceruminous occlusion?

We will all admit, no doubt, that in combinations of affections of the nervous and conducting apparatus the shortening of bone-conduction due to the former may neutralize the lengthening due to the latter. The degree of loss of air-conduction and the alteration of the aero-osseal difference (negative Rinnè) may here enable us to check results. As a rough rule I think that in pure "obstructive" deafness the amount of loss of A. C. should be about equal to that of the increase in B. C.

THE ACTION OF QUININE ON THE AUDITORY NERVE.

The more the nature of the changes produced by quinine in the internal ear is investigated, whether from experimental or clinical research, the more complicated the question becomes. Kirchner's somewhat crude experiments seemed to have proved that there was a congestion with effusion of blood in various portions of the labyrinth. It was later elicited that in each case the animal's death was accompanied by convulsions, and it was shown by Grunert that in animals killed in such a way as to produce convulsions, but without any administration of quinine, similar disturbances were produced in the labyrinth, though possibly in a less degree.

Wittmaack's experiments showed that changes were brought about in the auditory cells and in the auditory nerve of such a nature that Nissl's bodies disappeared, a phenomenon seen in degeneration of other parts of the nervous system. This very objective observation left unanswered the question as to whether congestion or anæmia was produced.

In favor of the anæmia theory was the analogy with the quinine amblyopia cited by Brunner. This is accompanied by an unmistakable anæmia of the retina and the citer argued by analogy that the same condition must be present in the labyrinth. It cannot be said that his contention has been altogether disproved, and some highly competent observers (I may mention among them Dr. Milligan of Manchester) are of the same way of thinking. The majority are, however, apparently inclined to believe in the existence of a congestive condition. Rossa reports the actual occurrence of visible congestion of the tympanic membrane as the result of the administration of quinine. Blake warns against its administration in cases of inflammatory congestion of the ear (though it must be admitted that the ultra-conservative or anti-paracentesis school headed by Zaufal and Piffel give salicylate of soda with a view of cutting short an acute otitis media.) Numerous writers accept without question the view that these drugs cause congestion of the labyrinth, and I myself am of this opinion, as the result of inference from general clinical observation and also from finding the tinnitus produced by quinine quieted by compression of the vertebral arteries. This has the effect of diminishing the blood-pressure in the basilar artery, its branches, the internal auditorys, and, thereby, in the vessels of the labyrinth.⁸ I may remind you that this compression may be made in the suboccipital region, the thumb and finger of one hand being placed in the hollows behind the mastoid processes while counter-pressure is exercised by means of the other hand placed on the forehead. As the arteries lie under the complexus muscle the pressure has to be rather firm. If such pressure checks pulsating noises or vertiginous feeling, the inference is that these are due to congestion in regions supplied by the branches of the basilar artery, probably the internal ear.

QUININE IN AURAL VERTIGO.

Allied to the question of the effect of quinine on the hearing-power is its mode of action in cases of aural vertigo. In regard to this it is hardly too much to describe it as specific. One might almost borrow a term from the homeopathist and call it dynamic. I need not recall to you the history of the matter. It was first supposed that enough had to be given to destroy the functions of the entire internal ear, the vertigo ceasing as soon as the auditory power was extinguished. Needless to say, one hesitated to adopt such a drastic measure, and quinine did not take in the routine treatment of aural vertigo the place which it deserved. With some it is more habitual

to treat "Mènière's disease" with bromide and iodid of potassium. I made an attempt to distinguish "congestive" from "anæmic" forms, giving bromides in the former and quinine in the latter, but found that so far as the vertigo was concerned, quinine was efficacious in both. As regards the dosage, I found large quantities quite unnecessary, and one grain or even the half or the quarter of a grain (with or without ten to fifteen minims of dilute hydrobromic acid) was ample. In fact, I ventured the opinion that quinine acted in regard to vertigo neither by causing congestion nor anæmia, but by exercising a direct sedative effect on the vestibular nerve. The recent experiments^o of Dreyfuss have confirmed this view and established it on a scientific basis. These experiments were carried out on guinea-pigs by means of the rotating table, and he found out the peculiar attitude adopted by the animal when the rotation reached a certain minimum degree of rapidity. When he rotated animals which had been dosed with quinine he found that a very much higher degree of rapidity was required in order to induce the adoption of this attitude, the sense of disturbance being obviously dulled by the drug. It seems to me that these results should give us the greatest confidence in the employment of this remedy in aural vertigo, remembering, however, that many other contributory factors in treatment are of undoubted importance. Among others we may note the value of a few days' rest in bed, the treatment of the alimentary system, the kidneys, etc.

In cases in which the diagnosis between aural and epileptic vertigo present difficulties, which Dr. Risien Russell so well described in a discussion by the Otological Society of the United Kingdom, I believe we have in quinine a test well worthy of consideration.

A rough rule in regard to the action of drugs in some important types of vertigo is that aural vertigo is benefited by quinine, epileptic by bromides, renal by iodides and traumatic by small doses of perchloride of mercury. I am assuming for the moment that there is no obvious aural lesion (polypus, cholesteatoma, etc.) which the practical otologist would not overlook, nor the ocular, cerebral, spinal or migrainous disorders which he ought to keep in mind.

SOME USES OF INSPIRATORY EFFORTS IN NASAL AND LARYNGEAL THERAPEUTICS.

In a paper by Klebs, read before the German Otological Society, attention was drawn to an observation of Hunter regarding a point in the physiology of the respiratory and vascular system, which seems to me of great importance to the rhinologist. It is to the

effect that during vigorous inspiration the expansion of the chest must mechanically induce a certain amount of dilatation of the cavities of the heart and great vessels. In-suction of blood is thus produced and this must *ceteris paribus* lead to a diminution of the blood pressure in the peripheral vessels and among others those of the upper respiratory passages. The direction of suction favors the formation of coagulation plugs in vessels which may have been opened, as by operations in the nose.

Patients are, therefore, recommended to avoid snorting out, but, on the contrary, to snuff vigorously up through the nose and spit out by the mouth any blood which has been drawn into the back of the throat. I have thus found the hemorrhage after operations for adenoids, for instance, diminished to an extraordinary degree if these instructions are carefully followed. I may incidentally offer as an argument in favor of the short anesthesia for these operations that the patient is all the sooner able to perform these voluntary movements.

Another application of inspiratory effort is its use in the emptying of accessory nasal sinuses. Mott of Arnheim recommended in cases of acute catarrh of the frontal sinuses that the patient should pinch his nostrils and then draw a full breath, thus exercising suction more or less on all the sinuses, but as a rule chiefly on the frontal, as having the most dependent opening. By changes in posture the various cavities may be put into favorable position as, for instance, the sphenoidal by bending the head downwards and forwards, as I have several times observed.

For the purpose of suction of the nasal sinuses the mechanical arrangement devised by Sondermann is very recommendable. It consists of a nose-piece like an anesthetist's face-piece in miniature provided with pneumatic India rubber cushions round its margins so as to fit air-tight. To the front of it is attached a tube and air-ball with valves so arranged as only to allow of exhaustion. The ball is compressed and only allowed to expand when the patient raises the soft palate by the utterance of the sound "ee" or "kee." With a little practice the knack is easily acquired and very marked suction effected. I have observed this in both the frontal and sphenoidal sinuses. The relief afforded in a chronic frontal catarrh in the person of the wife of a Canadian medical friend was most striking.

Again for the irrigation of the nose I think I have utilized the process of inspiration to great advantage. A small glass vase has a cork with two tubes, one going down to the bottom of the vessel,

the other only through the cork. The former has a bulbous orifice at its outer extremity to fit the patient's nose; the other is cut quite short. If the patient snuffs vigorously through the tube the liquid from the bottom is drawn up through the nose and back into the throat where it can be spat out. It will be remembered that when the air is snuffed up the nose it runs up towards the roof before going backwards, and the same direction seems to be followed in some degree by the fluid, as I have often seen the middle meatus thoroughly cleansed by this method. It has another advantage, namely that the *vis a fronte* draws it past the Eustachian tubes, so that the risk of infection of the middle ear is reduced to a minimum. The instrument reduced to its simplest form consists of a short tube with a bulbous orifice.

Inspiration may be practiced for the benefit of the larynx, and those who have not introduced Leduc's tube for the inhalation of powders into the larynx into their practice, would do well to give it favorable consideration. It consists of a glass tube of about 10 inches in length, one end of which is pushed to the back of the patient's throat while the other is placed in a small saucer containing the powder to be inhaled. The end in the throat is curved downwards for about half an inch through an angle of 100°. The opposite end is bent down for 3 inches so as to dip conveniently in the powder. The lips are compressed firmly round the tube and if a sharp sucking inspiration is made, a quantity of powder is drawn into the larynx. This can be done by the patient, who thus has placed in his hands the means of anesthetising a tuberculous larynx and of rendering the swallowing of nourishment possible in cases in which it would otherwise not have been so.

Among the most useful powders are: Di-iodoform as an antiseptic. Orthoform as a local anesthetic in ulceration. Anesthesin similarly a local anesthetic and antiseptic. It is useful also when there is no ulceration and tends to reduce edema. Its anesthetic action is in my experience shorter than that of orthoform. A combination of two parts of orthoform with one of resorcin acts as an excellent anesthetic and antiseptic.

There is no doubt that in persons with weak and dilatable hearts the inspiratory efforts I have described should only be practiced with the greatest discretion and in some cases should be avoided altogether. Incidentally I cannot help thinking that the violent inspirations through the nose, which are such a feature of some courses of physical instruction, may lead to cardiac dilatation, more especially in the presence of nasal or naso-pharyngeal obstruction.

THE VALUE OF INTRANASAL TREATMENT IN SPASMODIC ASTHMA.

Considerable divergences of opinion have been expressed with regard to the influence of intranasal disease in the production of spasmodic asthma. My views were stated in my address as president of the Hunterian Society of London in 1900.¹⁰ I then expressed myself to the effect that asthma is a disease in the treatment of which general medicine owes much to the specialist, and every practitioner in diseases of the nose must have before his mind cases in which the treatment of the nasal cavity has resulted in long and even permanent relief from the suffering depending upon this disease. I went on to say that, at the present time, physicians make a rational search for nasal symptoms and when such are present or suspected, then only are the patients brought before the notice of the rhinologist, and under such circumstances the percentage of beneficial results is by no means a contemptible one.

It would indeed be strange if the important experimental proofs of the interaction between the nerves of the nasal mucous membrane and those of the bronchial muscle, brought forward by Brodie and Dixon, were not confirmed by clinical experience. No doubt the exaggerated hopes raised by Hack and his followers, and the natural disappointments that ensued, were calculated to bring the nasal theory and the practice founded on it into discredit. The harm done thereby was small, however, compared with the result of leaving the nasal condition alone. I remember well the case of a medical man who, on account of asthma, had been obliged to give up his practice near London and retire, at great loss, to a town on the South Coast. He had acted on the advice of a physician who, he states, had actually not even examined his nose. At a later period, too late for the mischief done to be repaired, I found his nose packed with polypi which must have been already present, though no doubt in a lesser degree, when the asthma had established itself. Mr. Mayo Collier narrates another case in which the same spirit of skepticism had prevailed. On the other hand, all must have seen, as I have done, occasional cure and frequent relief following the removal of nasal sources of irritation. As illustrating the effect of nasal treatment I may say that I have observed at least two cases in which the attacks were checked by a nasal spray of mucin as devised by Mr. Stuart-Low. The immense vogue obtained by the advertised nasal spray "cures," which appear to contain chiefly cocaine, adrenalin and atropin, shows how beneficial nasal treatment can be. The results obtained by Francis by cauteriza-

tion of the septum, however explainable, offer strong confirmation of the value of the intranasal treatment.

In order to check my impression by the results of cases, I wrote some years ago to eleven patients and found that three of them were cured, three much improved, four relieved for a time and one not relieved at the time but cured subsequently. These were a few consecutive and unselected cases, and did not include others before and after, among which I could easily quote some of my most satisfactory results. This is very much what one would have expected and I think it sufficient to justify comparatively moderate views. In reality it probably makes the case for nasal treatment less favorable than it ought to be, because among the failures there were certainly some who did not give the treatment a fair trial. One, for instance, was an alien lady who, for reasons of economy, chose to be treated in the hospital, but being quite unsuitable for charitable treatment, withdrew herself from the institution and from my care, to the detriment of the result. In another instance the irritation caused by the operation induced a temporary aggravation of the asthma (a clear proof of the causal nexus), and the recovery which followed took place in other hands and was attributed, I am informed, to the administration of small doses of arsenic. Again, from one cause or another, intranasal operations are sometimes, as such, unsuccessful in my hands, though possibly other and more skillful or less experienced nasal surgeons can boast of having no disappointments. I can not.

SCLEROSIS OF THE MIDDLE EAR.

One of the most distressing problems is the nature, cause and, if possible, the cure of those insidious progressive and incurable forms of deafness without visible change in the tympanic membrane and without narrowing of the Eustachian tube. I need hardly say that I refer to what is now known as sclerosis of the middle ear, otosclerosis, ankylosis of the stapes, chronic labyrinthine capsulitis.

It has taken long for this condition to have its proper place in our otological nosology, many of the cases formerly described as nerve-deafness being doubtless examples of this disease, and many cases described as sclerosis being really chronic tympano-Eustachian catarrhs. The introduction of methodical tuning-fork tests corrected the former error to a considerable extent, the latter one being apparently still current, if we may judge by the descriptions of stenosis of the Eustachian tube and thickenings of the tympanic membrane in the accounts of cases put forward as instances of

sclerosis. There may no doubt have been in these cases an ankylosis of the stapes, but in any event they were certainly not cases of pure sclerosis as we now understand. In Professor Politzer's second last edition of his great text-book, cases of sclerosis were included in the account of chronic catarrhal adhesive processes, although among the drawings of his pathological sections were beautiful specimens of the disease in question. In his latest edition (1901) it need scarcely be said that the condition receives ample individualization and is most clearly named and described. Panse, Stern, Katz, Siebenmann and others have added important contributions to our knowledge and Denker's monograph¹¹ gives a complete study of all the original work on the subject. Recently it was discussed by the Otological Society of the United Kingdom, Dr. Albert Gray¹² adducing reasons for thinking that the osteitis and osteoporosis, now recognized as the main morbid anatomical condition, was attributable to a slowing or feebleness of the circulation. This view was corroborated by my own and others' observation of its occurrence in young anæmic women and also by the familiar fact of its frequent inception after child-birth. What its exact pathogenesis may be seems still obscure and of course the post mortem examinations are few in number and do not afford much guide as to the early stages. It is interesting to note the observations of Ducrest¹³ and Moreau¹⁴ to which Professor Kolisko first drew my attention. They found small osteophytic plates on the inner surface of the skulls of women who had died in child-bed, though it must be admitted this suggests nothing more definite than a tendency to osteoid changes in association with parturition. The part played by parturition in exciting osteo-malacia is perhaps also suggestive, though it cannot be said that the osteoporosis of otosclerosis presents much in common with the limelessness of the bones in the other disease. Possibly more numerous sections may throw greater light on this obscure matter. I think it probable that it will be found to arise from various causes. Among others I am disposed to give a prominent place to that strange disease, chronic osteo-arthritis deformans. In many of my cases of sclerosis I have found evidence of actual arthritis or of its early symptoms, with frequently a history of its existence in the family, especially in the mother. Again, in the examination of some cases of osteo-arthritis, I have found, with even quite slight disturbance of hearing, a negative Rinnè, but without indrawing of the membrane, narrowing of the Eustachian tube or improvement on inflation. In such cases the remedy most likely to be beneficial is the carbonate of guaiacol.

Siebenmann has initiated a plan of treatment by means of phosphorus and anything advanced with the weight of his opinion deserves our very highest consideration. I confess, however, a difficulty in following the arguments in favor of this recommendation. It is founded on the observations originally made by Wegner and confirmed by Miwa¹⁶ and Stoetsner, that in young animals the administration of phosphorus modifies the bones in such a way that where spongy tissue should be formed in the growing bone, dense solid tissue takes its place, which, examined by the naked eye and microscope, is found to consist of well-formed bone.

With these results before us, I fail to see *à priori* the advisability of administering a drug whose action seems to be to cause solidification of spongy bone, thereby rendering it all the more dense. Possibly there is some flaw in my reasoning and I am most open to conviction if I am in error. However, Professor Siebenmann¹⁶ says that in about 50 per cent. of the cases treated with phosphorus the result as regards "cessation of falling off of hearing-power" was very satisfactory. These statements may be accepted as unquestionable, but we are free to consider whether the cessation was a result or simply a coincidence.

This brings us to the very important question of prognosis, in regard to which all who have had much experience know the necessity of caution. We were formerly led to believe that these cases went of necessity from bad to worse till the patients became "stone-deaf," and we accordingly told them so and said we could do nothing for them. I cannot say there is very much more we can do for them, but we have seen so many cases who years later were no worse and, if anything, a little better, that we are justified in most instances in reassuring them that there is, at all events, no certainty of their getting entirely deaf or even worse than they are beyond the natural changes incident to advancing age. In short, although we cannot offer any hopes of recovery, we need not give a prognosis of despair.

As to the influence of child-birth in originating or increasing otosclerosis, there can be no doubt, but whether we are justified in prohibiting marriage or in inducing the extrusion of the fertilized ovum in the subjects of this disease, is a very anxious question. Marriage is not always followed by child-birth, and child-birth is not always followed by increase of oto-sclerotic deafness, so that on the whole, in view of the uncertainties of result on the one hand and the sociological advantages of wedlock on the other, we are only justified in giving warning as to possibilities, not in uttering a

prohibitive prognosis. One of my earliest patients with sclerosis of considerable severity eventually married, and instead of getting worse as the result of two child-births, got, on the contrary, rather better. If marriage in any given case is likely to bring increase of happiness and comfort and to lead to the realization of legitimate aspirations, the result is calculated to be beneficial.

Some years ago I tried the effect of vibration applied to the spine by means of a small electric motor on the spindle of which was attached eccentrically a disc of metal so as to impart a jarring movement during its rotation. This was intended to supply such mechanical vibration as is experienced in a railway train or omnibus which, as is well known, produces for the time improvement in the hearing, which is attributed to the noise rather than the vibration. The best situation is the lower cervical region and the vibration seems to be communicated to the ossicles with less risk of exhausting the auditory nerve than when noisy acoustic vibrators are applied to the ear. The treatment was applied for about five minutes at a time once or twice daily or at longer intervals until the patient, if improved at all, attained the maximum amount of improvement. I reported ten consecutive cases, in two of which very considerable improvement had taken place, in others a variable degree and in some cases none at all. The cases were of the typical sclerotic type and unrelieved by treatment carried out through the Eustachian tube. From time to time I meet a case in which this treatment affords some relief.

DOES NASAL OBSTRUCTION CAUSE OR KEEP UP CATARRHAL CONDITIONS OF THE MIDDLE EAR?

A question in regard to which a good deal of controversy has taken place is whether nasal obstruction, as such, can cause or keep up catarrhal conditions of the middle ear. The practical question was as to the utility or even the justifiability of operations for the removal of nasal obstructions on account of the persistence of aural catarrh in general obstructive deafness.

That the influence of such obstruction has been immensely overrated, I am perfectly convinced, but that in a certain proportion of cases it has a direct influence, I am equally certain. Naturally it is difficult to appraise its value in a large number of cases because the patients complain of the deafness and we adopt other methods of treatment over and above the removal of nasal obstruction. It is, therefore, only in rare cases, such as one in which I removed a septal obstruction on account of mouth-breathing and pharyngitis

in a singer who made no complaint of dulness of hearing but who afterwards stated that the ear on the same side as the obstruction, which had been his "deaf ear," ceased to be deaf when the obstruction was removed.

I think it will be admitted that if the changes in the middle ear are such as may be produced by non-ventilation of the tympanum, nasal obstruction may be included as a *particeps criminis*, and its removal may be considered as indispensable or at all events justifiable.

The best available evidence that non-ventilation is a causal factor in the aural disturbance is the occurrence of improvement in the hearing after inflation. This view was indicated by Dr. MacBride in a letter on the subject to the *British Medical Journal*¹⁷ and it is one with which I venture to think most of us will agree, as also with the converse that in cases in which no improvement follows, and especially if there is at the same time free entrance of air on inflation, the ear is not at all likely to be benefited by the removal of a nasal obstruction.

Perhaps it might be stated that in cases of pure nerve-deafness, nasal operation is all the more contra-indicated (the shock and hemorrhage in nervous or anemic patients may be highly injurious). Here is a rule which seems absolute, but I can quote a case in which the removal of adenoids led to the complete recovery of hearing in the daughter of a medical friend, whose nerve-tone and general health appeared to be impaired by the presence of the adenoids but who suffered from nerve-deafness and not obstructive. This, however, is the exception and the rule remains.

In judging as to the importance of nasal spurs, we may be very much misled if we are guided merely by inspection. We must remember that the majority of so-called "spurs" run obliquely upwards and backwards and, therefore, in the direction of the current of inspired air. What, therefore, may to our eye look like a very formidable obstruction, may be in reality nothing of the kind and, therefore, in no need of removal.

The debates in our British societies seem to have interested one of our German confrères, Dr. Röpke of Solingen, who, in connection with his studies on the injuries of the nose and its accessory cavities, investigated the question of the influence of nasal obstruction on the ear.¹⁸ He found that in the large majority of cases the hearing-power was lower on the side on which the nose was obstructed. If there was lowered hearing power on both sides, it was almost invariably the ear of the side on which the nose was

obstructed, which was the worse. A further outcome of the investigations was that the hearing (still in the majority of cases) was improved or even became normal within a few weeks after operative correction of the nasal obstruction, without catheterization or any other therapeutical measures being adopted for the middle ear. He attributed the aural trouble rather to the stagnation of the secretions behind the obstruction and to their being driven up the Eustachian tubes, than to the comparative negative pressure on which others have laid considerable weight and which I also think is not without some influence.¹⁹

We have, therefore, to decide whether the apparent obstruction is acting in reality as such and also whether the hearing is improved by ventilation of the tympanum.

NASAL OBSTRUCTION AND EUSTACHIAN CATHETERIZATION.

I formerly found many cases in which the passage of a septal spur or deflection interfered with the passage of the Eustachian catheter as usually practiced, and I have seen some in which practitioners of experience had pronounced the passage of the instrument as impracticable. One enthusiastic nasal operator glibly suggested that in such circumstances the obstruction should be removed.

By considering, however, the fact I have just recalled, that spurs generally run upwards and backwards, I hit upon the idea of introducing the catheter with the concavity upwards, the point lying on the floor of the nose under the anterior part of the spur. It will be readily seen that the farther the point advances inwards the more vertical room there will be for it under the spur, and thus placed it will get freer instead of more jammed, as it would be if the ordinary position were adopted. I published this in detail in the *British Medical* for September 28, 1901,²⁰ having found it then as now of the greatest value in what seemed impossible cases. In the first stage the tip of the nose has to be tilted well up, the shank of the catheter to stick up in the air, and the beak has to lie on the floor of the nose like the head of a golf-club on the turf. I have, therefore, ventured to christen it the "golf-club" method. My friend, Dr. Zarniko of Hamburg, has independently arrived at the same idea (a very natural one to a rhinologist) and published it in the second edition (1905) of his work on the diseases of the nose.²¹ As he states that he has seen it nowhere precisely described I am sure my publication of it has not come under his notice.

IMPORTANCE OF SOME OF THE SMALLER TECHNICAL DETAILS.

I wish in the first place to state my conviction that many patients whom I have failed to benefit, have received benefit from colleagues into whose hands they have subsequently passed, owing to my having failed to carry out some small technical detail as thoroughly as I might have done. The converse also is true, and among the details which have been apparently imperfectly carried out, have been the tightening of the relaxed membrane, the full and complete use of the Eustachian catheter and bougie, and the application of the cotton-wool drum.

In some cases the patient has assured me that instruments (catheters) had been passed up the nose, but that the ear had never before been so freely opened. What I have said with regard to the difficulty occasioned by a septal spur, explains some of these incidents. I would also attach importance to use of the intra-tympanic gum-elastic catheter of Weber-Liel. The fact of it being in situ in the Eustachian tube can be settled so decidedly by auscultation during inflation, that it can be used with a degree of confidence that the solid bougie does not give. In most cases, however, the fine transparent celluloid bougie serves our purpose, and I am indebted to Thost for an addition to its effect, namely, practicing vibration while it is in situ, as devised by Ernst Urbantschitsch. The vibration is effected by any of the ordinary mechanical external vibrators applied on the ear, on the mastoid or, as I find best, over the Eustachian tube on a pad of folded linen between the lower jaw and sterno-mastoid muscle. The outer extremity of the bougie should vibrate visibly. Thost's paper appears in the *Festschrift* dedicated to Professor Lucae.²²

The presence of general or circumscribed relaxation of the membrane is of course to be discovered by means of Siegel's suction-speculum, which should be in more constant use. The application of contractile collodion is, in my opinion, the best local treatment and I feel convinced that even after the layer has peeled off, the membrane remains somewhat tenser than before.

The artificial drum of cotton-wool, secured by a thread and moistened with paroleine, seems not to receive the routine use which it deserves, if I may judge by the cases calling for it which have come under my notice, in which others have not tried it.

LIGATION OF JUGULAR VEIN.

Some observations on the question of ligation of the jugular vein, which I communicated to the Otological Society of the United

Kingdom in June of last year,²³ met with the opposition which any views suggestive of abstinence from operative interference are apt to arouse. From remarks since made to me they appear also to have aroused some thought as to whether this operation ought to be performed as frequently as is done, and whether its effect is as innocuous and beneficial as is generally supposed. I will not trouble you with all the various arguments, but will remind you that the experience of Macewen, confirmed by Heine,²⁴ Cheatle and myself among others, shows that a large number of recoveries from sinus-phlebitis can be brought about by operation on the sinus itself without ligation of the jugular. That Macewen's remarkable series of successes²⁵ without ligature would be infinitely continued I am not, however, prepared to think likely.

In cases of thrombosis in the jugular bulb with pyemic symptoms, ligation and opening of the jugular is in my opinion most formally indicated, as it is also when the trunk of the jugular is obviously the seat of an infected thrombus. There is in most subjects ample means for the establishment of collateral venous circulation, but this affords at the same time free access for the infective materials into the general venous circulation and the lungs. When gradual occlusion by a growing clot takes place, the collateral circulation is steadily established, but when a ligature is applied on a non-occluded vein, the sudden disturbance of circulation and reversal of current is not so easily disposed of. I, as well as others, have seen proptosis from thrombosis in the cavernous sinus follow the operation and I have after death seen the pus extending down the deep vein of the neck after I had ligatured the jugular and drained it with utmost thoroughness.

You need not be reminded that half the cases of cerebellar abscess are associated with lateral sinus phlebitis and Pritchard has pointed out that in otitic abscesses in the cerebrum and cerebellum, the disease can generally be traced along the veins emerging from the part. The lateral veins of the cerebellum, according to Poirer, are directed outwards towards the circumference of the organ and terminate for the most part in the corresponding lateral sinus, the most anterior ones in the superior petrosal. Dr. F. W. Mott in a private communication states as follows: "The fact that the lateral veins receive the vein of the nucleus dentatus is, in my opinion, of considerable importance in connection with the formation of an internal abscess of the lateral lobe of the cerebellum by a direct extension of an infection of the lymphatics from the lateral veins

to the internal structures of the organ. From this it appears that ligation of the internal jugular vein would certainly lead to venous stasis of the whole lateral lobe of the cerebellum of the corresponding side."

In the case of occlusive clot, such as is common in chronic cases, a ligation can do little or no harm beyond, of course, the damming of the inferior petrosal sinus, but when, as in acute cases no such occlusion is present, I feel great diffidence in applying one. The opinions of authorities on this subject vary, and I beg to refer to my paper in the sixth volume of the Transactions of the Otological Society and to ask for an unbiased and "unheroic" consideration of this problem.

THE PRESERVATION OF MATRIX IN CHOLESTEATOMA OF THE MIDDLE EAR.

It must have happened to all who have had much experience in otology to have met with one or two cases in which the attic of the tympanum is lying freely open, the outer wall having completely disappeared while the cavity is entirely lined by a smooth pearly white membrane. Occasionally the loss of bone extends to the postero-superior wall of the osseous meatus, leaving an opening through which a cavity much larger than the antrum, though including this, is visible, the walls being covered by the same kind of shiny pearly white membrane. The patient may be free from all discomfort except the occasional accumulation of desquamative epithelial products which are easily removed. In such cases there has generally been a history of chronic suppurative inflammation of the middle ear of several years' duration, characterized by the occasional occurrence of severe headache and the extrusion of white macerated skin-like formations.

The course of events in such cases has been the development of the so-called cholesteatoma consisting essentially of a membrane lining the natural or pathological cavity in the petrous bone, desquamating so that the cavity is filled with epidermoid scales, the central ones of which have broken down into cheesy masses containing cholesterin crystals. Under the influence of moisture or inflammation the desquamation is increased and the cavity thereby filled and distended; the pressure causes the walls of this to give way at their weakest part, and if, as in the fortunate cases we are describing, this is the part presenting towards the tympanum and external meatus, the bone in those places is gradually eroded until

the cavity is laid so freely open that there is sufficient room for the exit of the contents.

The course of formation of such a cholesteatoma appears to be as follows: As the result of a suppurative inflammation extending into the antrum and adjacent cavities, the lining membrane becomes covered with granulations similar to those on an ulcer on the surface of the body; in some cases, especially the tubercular ones, progressive caries of bone results and very little or no attempt at healing takes place. In the absence, however, of such a dyscrasia, the smaller bony trabeculæ give way and a comparatively large cavity remains, lined with granulation tissue. As the suppuration subsides the edges of the perforation in the tympanic membrane may become cicatrised, and it is possible for the granulations to subside, and a return to a fairly normal mucous membrane be effected. Should, however, the perforation in the membrane be peripheral, and there is a ready continuity between the epithelium of its outer surface and the granulations on the wall of the tympanic cavity, the same changes take place as on the surface of a healing ulcer on the leg. The cuticular epithelium proliferates over the granulations from the periphery onwards until the whole ulcer, if not too large, is covered with a cicatrix which may be a fair substitute for skin. In the middle ear this process has been traced, as shown by microscopical examination, to a considerable extent into the tympanic cavity; there is no reason why it should not continue through the aditus into the antrum, at first reaching only those portions of the walls of the cavity which are nearest this orifice, then gradually extending over the parietes until the whole cavity is lined with an epithelial cicatrix. Sometimes in performing the radical mastoid operation one finds the cavity in this condition. At other times the part nearest the mastoid surface is filled with granulation tissue and the shiny cholesteatoma membrane is found on the inner wall of the antrum and the portions adjacent to the aditus. Probably in this case the epidermisation was gradually extending towards the remoter spaces and in time would probably have eventuated in the formation of a typical cholesteatoma. Of course it would be impossible to predict whether this would be favorable or unfavorable to the patient's life, as the centrifugal pressure exerted by it might result in erosion of the bone in the direction of the lateral sinus or the other cranial contents; if the circumstances were favorable and the *locus minoris resistentiæ* was in the direction of the tympanum and external auditory meatus, the bone might

give way, as in the instance I first quoted, and the contents of the cavity find their way into the outer passage of the ear. The lining of the cavities thus displayed is sometimes as perfect as could be desired and when freely exposed to the drying influence of the air and kept dry by the avoidance of the introduction of water and by the use of alcoholic instillations, the patient's condition may be one of complete comfort and safety. The main postulate is that the opening should be sufficiently wide for the entrance of air and for the immediate escape of desquamative products. It need hardly be said that it is only in exceptional cases that this takes place spontaneously in the favorable direction, and as soon as the condition of cholesteatoma is recognized the surgeon should be ready to carry out the operation necessary for its free opening. In the absence of such evidences of pressure as pain, vertigo, and bulging of the postero-superior wall of the meatus, he is justified in giving a trial to such dehydrating measures as the instillation or injection of alcohol in the form of rectified spirit, which may at first be diluted to the extent of 50 per cent. This preliminary treatment is all the more called for inasmuch as it is difficult, and perhaps impossible, to say beforehand how far the desquamating membrane extends into the mastoid cavities, and if this extension is very limited the necessity for operation may not arise. On the other hand, in the presence of pressure symptoms, no delay is permissible, and a free opening after the manner so well formulated by Stacke, is called for. If, when the opening has been made, it is found that the cholesteatomatous condition does not extend deeply into the cavities but that they are filled with granulation tissue and broken down bone, the hole should be thoroughly scraped out and suitable plastic arrangements for lining the cavity adopted. If the cavity is very small, any of the various well-known flaps may be formed, and cicatrization over the granulating surface encouraged, the rapidity of healing being in proportion to the smallness of the area which has to heal. Should the cavity be fairly large, I have no hesitation in saying that it should be lined by means of Thiersch's skin graft according to the technic so perfectly devised by Ballance. Even in the hands of one who is only moderately expert in the technicalities of this process, the results far surpass those obtainable without it in cavities of the same size.

In those cases, however, in which the cicatricial process has extended over the whole of the walls of the cavity, I venture to believe that we have already to hand as good a lining as we can desire, and

that it is not merely a justifiable, but a very desirable economy of the patient's time and tissue to preserve and make the most of the lining in question. I have in several cases put this principle into practice and found a complete healing of the parts and drying-up of the discharge produced with a rapidity and ease unequaled in other cases. Under such circumstances I content myself with gently scraping out the contents of the cholesteatomatous cavity and leaving the white shiny membrane *in situ*, swabbing it carefully but thoroughly with rectified spirit. I then insufflate a quantity of sterilized aristol, a substance recommended by Mr. Ballance for use when plugging the cavity he has lined with Thiersch's grafts, applying over this a light tampon of iodoform gauze, and, after about a week, starting the instillation of alcoholic drops.

In cases then, and there are such, in which a shiny uniform membrane is found lining the cholesteatoma cavity, I see every reason to think that this should be preserved instead of being scraped out, as is recommended by most operators up to the present. Should the membrane be pulpy, imperfect and not homogeneous, I am equally convinced that it is our duty to practice complete erosion and to line the cavity by transplantation of a skin graft.

In conclusion, although I can not boast of having made any original addition of value to our science and can merely pose as, at the most, a lucid expositor of elementary otology, I venture to believe that there have been few items of practical value published in French and German which I have failed to study for the benefit of my students and myself. I am bound to acknowledge above all our indebtedness to our German collaborators, whose industrious and enterprising use of their opportunities has so greatly advanced the usefulness and reputation of our art, as also to our French fellow-specialists who have clarified and systematized so much that was obscure and involved. It is to an Anglo-Saxon, however, that all are indebted for the establishment of otology on a sound basis of pathological anatomy, and Toynbee's collection is still an illustration of the remarkable powers of initiative which individuals of our race occasionally display, in spite of the absence of any present aid or immediate hope of reward. May we hope that in the friendly rivalry among the nations, others like Toynbee may help us to attain for Anglo-Saxon otology the position we would desire for it.

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THE RELATION OF THE PATHOLOGIC CONDITION OF THE NOSE AND ACCESSORY SINUSES TO THE VISUAL APPARATUS.*

BY J. A. STUCKY, M.D., LEXINGTON, KY.

Of recent years, many rhinologists and oculists in Europe and America have devoted much time, energy and thought to the relation of the pathologic conditions of the nose and its accessory sinuses to the visual apparatus. The subject is by no means unfamiliar, but the last word pertaining to symptomatology and diagnosis has not been said. For this reason, and also to show the intimate relationship that should exist between the two specialties, the subject has been chosen for your consideration at the beginning of this, the eleventh annual meeting of the American Academy of Ophthalmology and Oto-Laryngology.

The clinical signs of inflammation, suppuration, or obstruction of the accessory cavities of the nose and their influence on the eye, ear, nose and throat, and general health are frequently as varied and uncertain as the size, shape and position of these cavities.

Brawley¹ in a recent paper calls attention to some practically unrecognized pathological conditions of the nose, the symptoms of which are purely ocular. The patient never has reason to suspect their nasal origin, and as the use of the eyes almost invariably increases the headache in these conditions, he consults an oculist for relief. Another reason for the belief the patients have that the eyes are at fault, is that correct glasses relieve, for a time, all or a greater part of the symptoms. This may be explained by the lessened congestion of the ciliary body, resulting from a relief of the eye strain, however small in amount. As congestion is the basis of the nasal condition, even a slight reduction in its total amount will give relief for a time from the more prominent eye symptoms.

Emphasis is placed upon some of the more prominent points in the differential diagnosis between sinus and ocular headache. The former is usually unilateral, and if bilateral, the pain is greater about one or the other eye. The accessory sinus pain or discomfort is more frequently intermittent, rarely constant and as bad in the early morning as at night. It is not relieved by closing the eyes, is

* Address of the Vice-President read before the Eleventh Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology, St. Clair, Mich., August 30, 31 and September 1, 1906.

aggravated by bending the head downward, and is relieved by a free discharge from the nose, or the use of weak adrenalin and cocaine solution sprayed in the nose.

If the ethmoid sinus is at fault, the pain is referred to as neuralgia, of a boring nature, at the root of the nose, deep down between the eyes and radiating towards the side of the head. If the disease is active, there may be slight swelling of the upper eyelid and tenderness on pressure at the inner orbital angle or over the anterior wall and floor of the frontal sinus as compared with the opposite side. Vertigo or dizziness which accompanies the bending the head downwards, as in stooping to pick up an article from the floor, is often very pronounced, and differs from ocular vertigo in that it is the same whether the eyes are closed or open, and is not noticed except when bending the head downward, or jarring the body, or indulging in any sudden or violent exercise.

The character of vertigo is with difficulty described, more frequently being spoken of as a "confused, dazed feeling, caused by pressure in the head." The vertigo accompanying sphenoidal disease often approaches the cerebral type, while that accompanying disease of the other accessory cavities is similar to that found in other locations where pus is being formed in some cavity and absorbed into the circulation.

When this form of vertigo is very pronounced, I have not always found evidence of suppuration, but more frequently a swollen, boggy middle turbinate which blocks up the middle meatus so completely that the hiatus semilunaris and the infundibulum were completely closed, thus interfering with free aeration and the exit of the secretions from the frontal and anterior ethmoidal cells.

The etiology of both the vertigo and headache of nasal accessory sinus disease, is explained by the "Anatomic relation of the middle turbinate to the hiatus semilunaris and the infundibulum. The air in the frontal and the anterior ethmoid cells is imprisoned by the pressure of the middle turbinate against the lateral nasal wall, the turgescient tissues filling in the hiatus semilunaris and effectually blocking it. The lining mucous membrane of the sinus absorbs the oxygen from the imprisoned air, and thus creates a rarefied condition within the obstructed cells. This absorption results in a negative pressure and consequent swelling of the lining membrane and an increased blood supply to this region. Venous stasis to a greater or less degree results and may be shown by a swelling of the upper eyelid. Pressure of the congested tissues on the nerve endings, to-

gether with the stasis, produce the symptoms and results in the reflex vaso-motor disturbances in the circulation of the neighboring structures. The essence of the whole matter is that there is interference with the interchange of air between the nasal chambers and the accessory sinuses, and if pus or muco-pus is found, it indicates that infection has taken place from the nose." This or a similar view is advanced by Robertson², Ewing and Sluder³ and seems most plausible.

Most perplexing to the rhinologist and oculist are those cases in which there is pronounced mixed naso-ocular defect, in which all the symptoms of the eye strain and sinus disease are present. I have had several cases of this kind, of which the following is a sample: Miss T., with hyperopic astigmatism in both eyes, requiring plus 2., combined with plus .25 Axis 90°. This correction of refractive error gave marked relief for a short time, but the frontal headache, vertigo and lassitude continued. The turbinals were adherent to the lateral nasal wall and were removed; this was also followed by some relief, but it was of short duration. A radical frontal sinus operation was performed; pus and granulations were found in the frontal sinus, and the upper portion of the infundibulum was found completely blocked. The anterior ethmoidal cells contained a mass of disintegrated tissue in which pus and granulations existed. The peculiar and perplexing features of this case were: (1) The symptoms of ocular headache. The examination of the eyes showed a marked error of refraction. (2) There was no reference by the patient to any nasal trouble whatever, the pain described being apparently due to the eye strain. (3) The correcting lens afforded much relief, but the pain persisted rather more over the right than the left eye. Bending of the head forward, or jarring the body increased the pain and produced momentary vertigo. (4) The absence of subjective nasal symptoms and examination showed nothing abnormal except the adherent turbinals. It was only after weeks of treatment and close observation that disease of the frontal and ethmoid sinus was diagnosed. This case was seen with me by D. T. Vail and J. W. Murphey, and is cited to illustrate a not infrequent naso-ocular defect which is liable to lead us to overlook the concomitant nasal lesion where the ocular defect is pronounced.

Orbital abscess and optic atrophy due to spread of infection from the ethmoidal cells or bursting of an abscess originating in the frontal or maxillary sinus are not infrequently met with, and serious visual disturbances and infection of the delicate structures of the eye ball are not surprising when we recall the intimate aascular and

lymphatic relation existing between this organ and the nasal cavities. "*Onodi* has shown the relation of the optic nerve with the sphenoid bone and the posterior ethmoid cells, and in the majority of cases of active inflammatory conditions of these cavities the nerve is implicated. Indeed, if it were not for the double layer of periosteum which covers the bone forming the barrier between the nerve and the sinuses, and for the protection afforded by the nerve sheath, it would be difficult to comprehend how this nerve could escape involvement in affections of the sinuses, as the separating layer of bone is frequently as thin as paper and contains many dehiscences. The involvement of the optic nerve may vary in degree from a simple edema to an active retrobulbar inflammation."

Douglas⁴ calls attention to a low grade of pachymeningitis frequently found in cases of suppurative ethmoiditis as follows: "In addition to head pain and ocular disturbances there may be other symptoms of a general character, such as fever, evidence of cerebral irritation and congestion, neurasthenia and gastric disturbances. The increased and irregular temperature curve is due to pus absorption. Gastric disturbances may be due to swallowing some of the fetid discharge of the sinus, and loss of appetite or a passive gastritis may result. Such cerebral symptoms as malaise, inability to concentrate the mind and actual depression, verging almost on melancholia, are seen more frequently in the chronic cases. When cerebral symptoms arise in sinusitis they indicate the involvement of the meninges without perforation of the wall of the sinus or, more usually, an actual perforation, in which later event abscess of the brain rapidly follows. Abscess of the orbit occasionally gives rise to cerebral complications, as meningitis, abscess of the brain and thrombosis of the cavernous sinus may follow.

I have seen one case of ophthalmoplegia externa in a case of supuration of the frontal, ethmoidal and maxillary sinus, in which the radical operation of Killian gave complete relief of all symptoms. The case is similar to one reported by Holmes.⁵

I am convinced from my investigations that many cases of pareses and paralyses of the extra-ocular muscles, supposed to be due to rheumatism or to syphilis, are caused by sphenoidal or ethmoidal disease, the muscles being involved, either by inflammation or by pressure from pus formation, or perhaps to peripheral infection of the nerve filaments supplied to the muscle involved.

In nasal accessory disease, the majority of the profession associate with them the discharge of pus or muco-pus from the anterior or posterior nasal cavity. These are not the cases which give us the

most concern or that cause most trouble, or are difficult to diagnose. It is in the cases without nasal symptoms or obstructive lesion or discharge of pus or muco-pus that we find the greatest difficulty in diagnosis. It is what is aptly termed closed empyema which Douglas defines as follows: "The term closed empyema is applied to a cell or group of cells in which the discharge does not find an outlet, but is retained by a cyst within the cell, producing in time characteristic symptoms from pressure or deformities from enlargement of the cell. It is the closed empyemata which perforate bordering cavities, such as the brain and orbit, and the closed empyemata are not limited to the ethmoid cells. They are often seen in the frontal and the sphenoidal sinuses, but rarely in the antrum."

Not only are we misled by the abscess of external evidence of pus formation in these cavities, but we frequently meet with cases in which there is pressure between the turbinals and the septum which give all the symptoms of sinusitis when in fact pus is not present. The removal of the pressure alone gives relief.

I know of no diagnosis more difficult than that of closed empyema of nasal accessory sinuses. With all our care in weighing the objective and subjective symptoms, together with the careful use of trans-illumination and the x ray, our conclusions are often arrived at by exclusion and intuition.

In the study of the region now under consideration there is still "much timber, tall and uncut"—much anatomical and physiological work to do, and a still greater field for study in the pathological realm. Laurels and gratitude await the patient and persevering investigations of our members as to the etiology, diagnosis and treatment of diseases of the nasal accessory cavities. Medical Journals and text-books are full of the results of the investigations of our ablest men, and from these every step to be taken to arrive at a correct diagnosis can be learned. The ocular symptoms common to or produced by affections of the nose and accessory cavities are due to either an acute or chronic condition and are amenable to either local, systematic or surgical treatment; often all being required to give the desired relief. I have little regard for the long continuance of local treatment—it rarely does more than palliate the symptoms and delays the inevitable, thorough, systematic overhauling, or removal of the pressure and release of contained secretions, pus and granulations by surgical intervention. The part played by the lithemic expressions in the naso-pharynx, in the production of disease of the nasal accessory cavities, is an important one, especially in the acute form,⁴ and should be carefully looked after.

In the acute stage of the infection, the indications for treatment are entirely antiphlogistic, the chief indications being, first, to relieve suffering and discomfort; second, to prevent suppuration. The patient should be put to bed, the room kept quiet, and bright light excluded as long as the eyes are sensitive. Arouse the secretions with full doses of calomel (5 to 10 grains) combined with a small quantity of ipecac. This should be followed in six or eight hours by a saline cathartic, sodium salicylate and sodium bromide, 10 grains each; pilocarpin grains 1-10 to 1-20 in four ounces of water every two or four hours till pain is relieved and diaphoresis is established. The activity of the skin should be maintained by frequent bathing, great care being used not to chill the patient when giving the bath. Dry heat should be applied to the frontal and occipital regions by the use of hot water bags. Locally, a nasal douche of hot normal saline solution applied both anteriorly and posteriorly, or Seiler's solution in one-half strength, should be used twice daily. This not only keeps the passages clean, but is very soothing and grateful to the sufferer.

If the nasal passages are occluded or uncomfortably "stuffy" a small quantity of the following sprayed into the nostrils every two to four hours is most effective and rapid in its action: Sodium chloride grains 5, Resorcin grains 5, Adrenalin solution (1 to 1000), drachms 1, Aqua drachms 7.

This strength of adrenalin is all that is necessary, practically no reaction following its use. Cocaine and opiates are mentioned only to be condemned, because of their unpleasant reaction and having a tendency to thwart the objects aimed at in the treatment. Only in exceptional cases have I found their use advantageous.

Special care should be given to the systemic condition, the secretory functions being maintained in an active state. On account of the great susceptibility to recurrent attacks, convalescence should be guarded and the patient kept in doors until thoroughly restored.

Acute catarrhal sinusitis, whether involving the ethmoidal, frontal, maxillary, or sphenoidal cells usually subsides spontaneously under appropriate antiphlogistic treatment. When suppuration occurs the imprisoned pus must be evacuated and thorough drainage maintained or serious results may follow.

The following conclusions given by me in a recent paper on this subject embodying the results of my observations for the past fifteen years, are still held to be conclusive of the fact that not enough attention has been given the treatment of the acute form of nasal accessory suppuration, and that the importance of its early recogni-

tion is not fully appreciated. The suppurative process may exist in a latent form, giving rise to no marked local symptoms, and eventually resulting in ocular or systemic infection. Chronic inflammation in a closed cavity has a tendency to pus formation, especially in the nasal accessory sinuses. While I have never met with a fatal case, such an issue undoubtedly occasionally occurs from absorption of pus or the invasion of suppurative inflammation through the optic foramen or the holes in the cribriform plate. The more common sequels of chronic suppuration of the accessory sinuses are manifested by a low and persistent toxemia or some form of neurasthenia and migraine. The treatment is the same as for pus formation in any other part of the body—that is, free drainage and the removal of the morbid material. The middle turbinate body most frequently causes obstruction of the natural openings and thus interferes with free drainage, and its early removal decreases the necessity for more extensive and radical operation later. The radical operation of opening the sinus externally is not advised unless there is evidence present of carious bone and granulation tissue, which cannot be removed intra-nasally.

In this day of specialism, there is a danger of our becoming cyclopic, with only one eye that sees only the oto-rhinological part of the body, overlooking the possibility of danger that may result to the ocular apparatus to which it is so intimately related.

Each case is a law unto itself, and as stated before, the symptoms often vary as much as do the size, shape and position of the sinuses. For these reasons the oculist and rhinologist, instead of drifting apart, should work closer together.

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THE MIXED LARYNGEAL INFECTION.*

BY CARL E. MUNGER, M. D., WATERBURY, CONN.

That two diseases may exist at the same time in the human body is not to be denied; such being the case, it would not be at all surprising that one disease should exercise a preponderating influence upon its fellow. That one disease lying *dormant* should have a restraining influence or power over another invading the system would not be remarkable. We have all of us, I suppose, seen instances of the period of invasion of acute infectious diseases being lengthened far beyond the period of expectation or experience by the outbreak of some other disease.

In the larynx, we have exceptional advantages for observation and the whole range of the pathological changes is carried on under our very eyes. We have also in a syphilitic or tubercular larynx plenty of time for observation, and the various gross changes can be studied at our leisure. The statement that the two diseases may and do occur not infrequently together is made more or less positively in the books written by Tobold, Schroeter, Gerhardt, Gottstein, Isambert, Schech, Gougenheim, Zeisel, Grünwald, and others.¹ Schnitzler and Rice have called the attention of the profession to the concurrence of lues and tuberculosis of the larynx. That I can bring nothing new before this body, I am well aware; but it may not be unprofitable to give a little time to the consideration of these two frequent diseases of the larynx, as they may occur together. The diagnosis of a tubercular laryngitis alone or of a syphilitic laryngitis alone may be easy or difficult as the cases are typical or atypical. How much more difficult may it then be when syphilis and tuberculosis are at once present in the system, and lesions of one or the other or both are to be observed in the larynx.

Helwes divides the manifestations of laryngeal tuberculosis into inflammatory or hyperplastic, and ulcerous or destructive, that is to say infiltration or ulcer; but even here the inflammatory condition may and most frequently is the precursor of the ulcerous, and if you will permit me I will quote briefly his differentiation of ulcerous tuberculosis of the larynx:

* Read before the New York Academy of Medicine, Section on Laryngology and Rhinology, November 28, 1906.

(a) "The ulcerations which are the results of infiltration are irregular in form, of uneven base and with eaten out sides or walls, the base being covered with a thin, white matter in which are to be found great numbers of the tubercle bacilli.

(b) "Another form of ulcerous tuberculosis is that called the lenticular ulcer found mostly at the base of the epiglottis, and the false cords.

(c) "A third form of ulceration (after Ortho) is that in which the ulcers are very chronic, and are different from the others by reason of their deepness and high wall-like sides, which are often thin and which often split. These are found mostly at the posterior part of the vocal cords, over the arytenoid cartilages and the false cords, and frequently extend as far as the perichondrium which they attack and destroy."

The *syphilitic lesions* of the larynx which should especially be considered are the tertiary ones, which are gummata which sooner or later tend to break down and become more or less destructive in their tendencies. These lesions, tubercular or syphilitic, are usually easily differentiated from the general history of the case and the effects of the antisiphilitic treatment which may be instituted.

There are, however, many cases which come under our notice which it is impossible to diagnose at once, and indeed even after careful consideration. I refer to that rather large class of laryngeal cases, where the disease may be tuberculosis or syphilis, or both. These cases are to be especially remarked from their lack of tendency to ulceration, although ulceration may infrequently be present and resemble the cases classed by Theisen² as hypertrophic tuberculosis of the larynx, or as he says, more properly hyperplastic tuberculosis of the larynx, which he divides into two classes. The first includes those cases in which the characteristic changes in the larynx consist of either marked hypertrophy or hyperplasia of the tissues in which tumor-like formations occur without ulceration, the second in which distinct tumors occur usually covered with intact mucous surfaces and called by the French the "type of Avelis," which seem to originate frequently in the Ventriculus Morgagni, and may or may not be pedunculated. He further goes on to state that "there is a form of syphilitic tumor which I have observed several times, which like the tuberculous tumor, may or may not be pedunculated, is covered with intact mucous membrane, and may not break down for a long time." Such cases are extremely difficult

to differentiate clinically from hyperplastic tuberculosis. A history of syphilis can be obtained and K. I. would clear up the diagnosis, syphilitic hyperplasia, which is made up simply of granulation tissue and quickly breaks down, forming the typical ulceration. This is true also of syphilitic granuloma, which is simply an inflammatory condition, which develops around an ulcerated surface and of the "Gumma."

The case which brought the subject of combination syphilis and tuberculosis of the larynx strongly to my attention was that of a man about 40 years of age, who came under my care June 23, 1904, with a history of hemorrhages two years previously, and a diagnosis of pulmonary tuberculosis. Out of door life and hygiene had checked the pulmonary lesions, and he had considered himself in good physical condition. For about six months his throat had been sore, and he would sometimes lose his voice. He coughed frequently on account of an almost constant feeling of irritation in the throat. He was well nourished, digestion good, though the appetite had recently become poor. There was no dysphagia. Examination of the lungs showed marked bronchial breathing at both apices. He had a hoarse whispering voice, which symptom was the reason of his applying for help. Tubercle bacilli had been found at different times during the early part of his pulmonary trouble. He had a syphilitic history extending back for nine years. Examination of the larynx showed an irregular mass on the right side of the larynx encroaching upon or reaching over the left arytenoid occupying about two-thirds of the interarytenoid space above the cords. The cords themselves at this time did not seem to be involved, and only showed a moderate degree of congestion. He was under my care for about nine months, all of which time he was taking large doses of K. I. The tumor seemed at first to diminish somewhat in size with a moderate amount of improvement in the voice, but in October he began to have a moderate amount of dyspnoea, increased on exertion, with severe attacks coming on in paroxysms.

About this time, he had a rather copious hemorrhage from the left upper lobe, which cleared up quickly. Several small pieces of the tumor were removed and persistent steaming of the throat again rendered him comparatively comfortable. In December, a piece of the growth was sent to Dr. Zabriski for examination, who returned the report that it was distinctly not tubercular and was probably syphilitic. During January, his dyspnoeic attacks became more frequent and more severe, so much so that I had decided that in-

tubation or tracheotomy was demanded; but while on a visit in another city, he was taken with a severe attack of suffocation and a tracheotomy was performed. During all this time his temperature had been normal, the thermometer having been used two or three times a day. I did not see this case again for more than a year, when in April, 1906, he again came into my office with the tube still *in situ*. At this time, he had the appearance of a man who was very ill, emaciation quite marked, heart feeble. The tumor was markedly enlarged, the right cord could be seen only for a small space on attempted phonation, and there seemed to be a rather large amount of sub-glottic thickening. At this time he had the general appearance of a consumptive. The latter part of May, he went to the mountains, staid for a while, and died at home about the middle of August during my vacation.

Another case which has been under my observation for a year is also interesting. A young woman, 25 years of age, came to the office September 4, 1905, with the history of having had jaundice two years previously. She began to cough in January and in June the tubercle bacilli were found. I had treated the father for tertiary syphilitic lesions of the soft palate, uvula and epiglottis in 1891. She had not been able to speak aloud since April, but had been hoarse for a year. Both cords were much thickened and red. There was an irregular mass involving the left arytenoid and extending into the interarytenoid space.

Examination of the sputum showed the presence of tubercle bacilli, but few in numbers. The digestion was in good condition and she presented the appearance of a healthy young woman. There was neither dysphagia, odynophagia nor dyspnoea. The condition of the throat remained practically unchanged for six months; but by the first of June, the mass seemed to be getting slightly larger, and about July 1st, there was a small ulceration at the most prominent part of the tumor. At this time, both ventricular bands were thickened, the left markedly. There was a moderate amount of interarytenoid thickening, the cords were as they had been, clear. She began to loose weight slightly at this time.

Examination of the throat in September of this year showed both ventricular bands were much thickened (a marked increase during the past month), a slight ulceration on the mass involving the right arytenoid, and a moderate amount of interarytenoid thickening. The voice has remained unchanged during all these months. On several occasions, I have found superficial ulcerations present, but

these would remain only for a short time causing only a very moderate amount of dysphagia. Both these cases were treated with K. I., the first one especially for a long time and with large doses, the other with doses of a much smaller size on account of the untoward effects on the stomach, though she has been on Donovan's solution for several months.

At the present time, this young woman's throat presents about the same objective appearance, except that there seems to be a symmetrical decrease in the thickening, enough decrease to be noted on inspection, but not enough to make any perceptible improvement in the voice. She is slowly losing weight, and is apparently gradually losing ground. During most of the time that she has been under my control she has professed to feel perfectly well, and has complained only of the aphonia.

A case quoted by Helwes as occurring in Seiffert's Poliklinik, I will briefly relate as being a good example of the combined tubercular and syphilitic lesions. A man, 41 years of age, came under observation October 24, 1887. He had contracted syphilis 15 years before, and did not have medical attention. He was married but there had been no children. His wife had died three months previously of "Consumption of the Lungs." For the past two or three months, his voice had not been clear, but his respirations had been normal. For the same length of time, there had been an ulcer on the right side of the lower lip, which had not seemed to get better. The report of the examination of the patient was as follows:

The patient is big, strong, and well fed. His voice is very hoarse. No lesion can be detected in the lungs. On the right side of the lower lip extending from the lip towards the chin is a red, hard ulcerous mass. The epiglottis is wide, lying a little towards the front. The right half of the larynx is normal. On the left side, under the free border of the ary-epiglottic ligament may be seen a light, red, half round tumor, with the tissue immediately surrounding it, very red, protruding into the interior of the larynx almost covering the left false and true cords. The diagnosis was gumma of the lower lip, and gumma of the larynx. The treatment was that for tertiary syphilis. Later in October, his voice became clearer. November 10th, his voice was clear, the gumma of the larynx was much smaller, so that the left false and true cords could be seen. The left vocal cord at its anterior half was red and irregularly thickened, without any ulceration whatever. The left vocal band was also a little thickened. Jan. 1, 1888, the ulceration

of the lip was much deeper, but could be observed to be in a swollen condition, though not markedly so. On the free edges of the vocal cords, which are reddish and thick, are numerous ulcerations close together. January 3rd, tubercle bacilli were found in the sputum, and a slight lesion was demonstrable at apex of right lung.

Gerhart³ tells of a case which he considered a combination of tubercular and syphilitic laryngitis, and found that the anti-luetic treatment had no effect on the lesions, which were congestion and swelling of the cords with small ulcerations on the right vocal cord associated with a big ominous crater-like tumor on the rear wall of the larynx.

Parker in his book, "Diseases of the Nose and Throat," 1906, describes the lesions of the larynx, syphilitic and tubercular, as follows: "The syphilitic lesions of the larynx are: 1. Gummata. 2. Ulcerations. 3. Perichondritis and necrosis. 4. Resulting scars and deformities. There are three varieties of gummata, circumscribed, diffuse and nodular. These all occur in the larynx, usually break down rapidly, but may remain stationary for a long time. The *diffuse* are ill-defined, smooth round swellings usually of the epiglottis, arytenoids or ventricular bands, although any part may be involved. The color is deep red. Later yellowish spots are often seen in their centers, which denote a beginning of softening. Though the swelling has no definite margin, the area of injection is well marked.

The *circumscribed gummata* are rare, and occur as single distinct tumors on epiglottis, arytenoids or cords. They are smooth, round in shape, deep red in color, and often show signs of breaking down.

The *small nodular* are rare, are multiple, and seen as small rounded elevations about the size of a pea. They are often so numerous as to coalesce. The cords are most frequently affected. *Superficial ulcerations* are rare. The *deep ulceration* is the most common manifestation of laryngeal syphilis. Superficial ulcerations when they do occur are most common on the epiglottis. Deep ulceration is a sequel of a pre-existing gumma, is punched out and crater-formed with sharp edges, with a red swollen and often oedematous areola. The base is covered with pus and necrotic shreds which give it a grey appearance.

Perichondritis may be the seat of gummatous infiltration, or it may be caused by infiltrations spreading from the overlying structures. In early stages, perichondritis is characterized by great swell-

ing and limitation of the affected parts. Later, there is ulceration or abscess formation followed by necrosis of cartilage, *scars or adhesions*.

The epiglottis may be partially or completely destroyed, or may become adherent to neighboring structures. The cords may adhere together, or be united by a web which commences in the anterior commissure or under surface of the cords and spreads backwards, often leaving but little room for respiration. Similar adhesions may take place between one cord and the opposite ventricular band. A narrowing of the subglottic region of the trachea may not be uncommon. Fixation from one or both cords from true or false ankylosis of the Crico-arytenoid joints is quite common.

Hyperplastic outgrowths may occur sufficiently large to cause dyspnoea, subjective symptoms of laryngeal syphilis and pain, dysphagia, dyspnoea and alteration of voice. The pain is apt to be severe. The dysphagia is most marked when the epiglottis is ulcerated. Dyspnoea is fairly common, and may be due to hyperplastic outgrowths, perichondritis, impaction of a sequestrum, oedema, fixation, or paralysis of cords, or formation of cicatricial bands and adhesions. The voice may be hoarse, hard, and rasping, weak and whispering or completely aphonic. If there is necrosis there may be fetor of breath.

The tubercular lesions are: (a) The *miliary tubercles*, which are small, round millet seed like nodules, yellowish in color, and scattered in groups over the laryngeal mucous membrane. They are usually accompanied with oedema and tend rapidly to coalesce, soften and ulcerate. (b) *Single, localized tuberculosis tumors* are met with in the early stages of phthisis or in cases of chronic lung disease. They are small, rounded tumors with a somewhat pale surface, and slightly oedematous appearance.

The surrounding mucous membrane shows no signs of inflammation, and is often anaemic and may remain unchanged for months or years, but eventually breaks down and forms ragged tubercular ulcers though occasionally they may disappear spontaneously. They most commonly spring from the arytenoid folds usually a little to one side of the middle line. Similar tumors are more rarely seen on the edges of the epiglottis, arytenoid cartilages, and false or true cords.

(c) *Sub-glottic oedema* may occur, characterized by symmetrical infiltration of the under surfaces of the vocal cords causing considerable swelling and suggesting another pair of cords on inspec-

tion. These infiltrations may be pale or congested, show little tendency to ulceration, and may cause considerable stenosis.

(d) *Limited infiltration* with or without superficial ulceration is most commonly met with when the infection is limited to the intrinsic parts of the larynx, and presents this picture. The epiglottis is very anaemic with small veins coursing over its surface. The arytenoids are just sufficiently oedematous to obliterate their normal outline. One cord is red with rough uneven surfaces, and there may be a superficial ulceration over the vocal process. This picture may be varied by both cords being affected or by one or both vocal bands being swollen, and sometimes superficially ulcerated, or again there may be slight thickening in the inter-arytenoid region with subsequent superficial ulceration and later still pale oedematous granulations overhanging and hiding its edge. In rare instances the extrinsic parts of the larynx are affected and ulcerations are seen on the epiglottis, the aryteno-epiglottidean folds or the arytenoids.

(e) *Extensive infiltration with oedema* usually affects the arytenoids causing at first a smooth pale translucent swelling of the mucous membrane modifying the normal outline of the parts, and as the disease advances there is considerable alteration in the shape of the parts. The arytenoids and aryteno-epiglottidean folds become greatly enlarged, and pyriform in shape, if bi-lateral, completely hiding the inter-arytenoid fold and rendering the approximation of cords mechanically impossible. The epiglottis is turban shaped. Sometimes small yellowish tubercles may be seen in this oedematous translucent membrane, which after a time caseate and break down, causing multiple superficial ulcers. These may coalesce, forming a large irregular greyish ulcer with worm-eaten appearance.

(f) *Deep and destructive ulcerations* are found at later stages. If the upper parts of the larynx are affected there is much oedema, but in the lower parts ulceration may extend deeply while the cartilages may be affected and even necrosed without the occurrence of much swelling. The epiglottis may become ragged and destroyed. The arytenoids may be extensively ulcerated, their cartilages becoming necrosed. Perichondritis of the thyroid or cricoid cartilage may occur, causing fixation of the cords, and ultimately leading to necrosis and formation of abscess which may burst into the larynx or burrow into the neck.

The symptoms are *dysphagia*, due to passage of food over ulcerated surfaces or to movement of larynx during deglutition and *dyspnoea* due to sub-glottic oedema, and excessive swelling of supra-glottic region.

Cough and *expectoration*, and alterations in voice, functional loss of voice is not uncommon, the weakness being due to want of expiratory force. The chief local causes are the infiltration of the abductor and tensor muscles, oedema or swelling mechanically, perichondrosis, ankylosis of the crico-arytenoid joint, paralysis from pressure on the recurrent laryngeal nerve or swelling or ulcerating of the cords themselves.

I have taken your time in the rehearsal of these well-known typical objective signs of syphilitic and tubercular laryngitis as the cases of mixed infection or of supposed mixed infection seem far apart from them. These cases seem to be in a class by themselves. We have the history of tuberculosis, and we have the history of syphilitic infection. The resulting lesions seem to be neither syphilitic alone nor tubercular alone. They approach most nearly in appearance, the hyperlastic laryngeal tuberculous cases referred to by Theisen; but in one of my cases, examination of the infiltrated tissue showed no evidence of tubercular infection, and on the other hand, thorough syphilitic treatment made no appreciable effect on the new mass of tissue, while near the end of life this unfortunate looked tubercular and died of tuberculosis.

These cases seem contradictory. Instead of finding that a combination of syphilis and tuberculosis in the larynx runs a rapid course, or a more rapid course than either disease would alone, we find that the lesions are sluggish, the general health of the patient does not seem to be much affected unless the lesions are so pronounced as to interfere with deglutition or breathing. If the lesions were syphilitic alone, from what we know of tertiary syphilis in the throat, we should expect to get the same brilliant results that we can get from its treatment when uncomplicated. If the lesions were tubercular alone, why could not this be determined by examination of tissue. We can hardly say that these lesions are neither syphilitic nor tubercular, and are simply inflammatory, as we have undoubted evidence of the double infection. It is a problem, Gentlemen, and as Isambert⁴ says, "The presence in the larynx of such a combination proves in most cases a very hard problem to solve."

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LYMPHO-SARCOMA OF THE PHARYNX LIMITING THE MOTIONS OF THE JAWS AND AXIS BY INVADING THE PREVERTEBRAL AND PTERYGO-MANDIBULAR SPACES.*

BY OTTO T. FREER, M.D., CHICAGO.

History. The patient was well until December 1904. At this time, he began to snore in his sleep and to have gradually increasing difficulty in breathing through his nose, so that in the course of some weeks he had to keep his mouth open at all times to breathe. His voice also at this time acquired the dead quality of obstructed nasal respiration and he gradually became somewhat deaf. He was first seen at the Chicago Polyclinic on September 5, 1905. Posterior rhinoscopy at this time showed a pink growth with smooth surface arising from the vault of the pharynx and reaching downward until it almost rested upon the soft palate. Anterior rhinoscopy showed the nares to be clear. His hearing for the watch at this time was two inches for the right and three inches for the left ear. In spite of the suspiciously rapid development of this mass at a period of life when adenoid growths usually atrophy, its gross appearance so closely resembled that of a hypertrophied pharyngeal tonsil that it was deemed such and thoroughly removed with the pernasal forceps through the nose, perfect nasal respiration being established. The amount of tissue excised was great. Histologic examination of a microtome section of the excised growth showed nothing that could not accord with the diagnosis of a large fibrous hypertrophy of the pharyngeal tonsil.

Shortly after the operation, the patient was lost from observation and was not seen again until September 1st, 1906, when he stated that nasal breathing had remained perfect until two months after the operation when the snoring and nasal obstruction reappeared but never became as marked as before it. The removal of the growth was followed by a discharge from the left ear which has existed ever since. There was no improvement in the deafness at any time. Since the operation he has had occasional nosebleed occurring about once in two weeks, the blood in some of these attacks flowing down behind the palate. In the few months preceding his second visit to the clinic, he declined rapidly in strength and weight and had headache with vomiting in the morning at times. In July, he began

* Read before the Chicago Laryngological and Otological Society, October 16, 1906.

to notice difficulty in opening his jaws and in swallowing, symptoms which have persisted with increasing intensity ever since.

The record of the examination of the patient to October first, is as follows: Inspection of the oropharynx shows a bulging downward of the soft palate evidently due to a mass resting upon it above. The posterior wall of the pharynx also bulges in a forward direction so that it nearly reaches the velum palati making posterior rhinoscopy impossible. Exposure of the parts behind the soft palate by raising it with a palate hook shows a portion of a soft pink, nodular tumor to the right of the median line which extends out of sight up into the nasopharynx. The jaws can only be opened part of the way, being suddenly checked by a resistance when the incisors are $\frac{5}{8}$ of inch apart. The lateral motions of the jaw are also nearly arrested in both directions. Rotation of the head in the atlo-axoid joint is only possible to a slight degree, the head being turned by twisting the entire neck. Nutation is free. In order to palpate the nasopharynx the patient's jaws had to be pried open with a gag, causing him some pain. The finger in the nasopharynx feels a soft tumor nearly filling the postnasal space and occupying the usual situation of an adenoid growth. Palpation of the posterior pharyngeal wall shows it to be carried forward by a soft elastic mass which bleeds freely when touched. The tumor can be indistinctly seen through the right naris from in front but it does not enter the nasal fossae, which are free. The pulse is rapid, 120 to 130 beats to the minute and this frequency has been constantly found whenever the pulse was noted during the past month. The temperature when taken has been found to vary between normal and 100 Fahrenheit. The pupils react normally to light and accommodation. The cardiac and pulmonary physical signs are normal with the exception of persistent tachycardia unaccompanied by demonstrable cardiac dilatation.

Laryngoscopy is imperfect because the smooth bulging of the posterior pharyngeal wall prevents carrying the mirror far enough back for a good view into the larynx and the hindrance to the opening of the jaws adds to the difficulty. The motions of the left vocal cord may be faintly seen while the right one is hidden by the epiglottis.

An enlarged gland of the size of an almond may be felt at the angle of the jaw on the right side. The retromaxillary regions are partly filled out by an indistinct swelling.

Vision is perfect as proven by test types. There is no flushing of the integument of the ears and no salivation. Swallowing is some-

what difficult, the patient saying that he has to accompany the act with the inspiration of air in order to make solid food go down. He drinks without trouble. The patient speaks with a voice characteristic of postnasal obstruction.

Examination of the ears shows the right membrana tympani intact but retracted, the light reflex being present. The membrana tympani of the left ear is destroyed, the malleus being seen above as a granulating stump. There is a purulent discharge from the left ear.

Reexamination of the patient on October ninth, showed that the lateral motions of the lower jaw had become free again.

Beginning on September 7th, injections of adrenalin 1 to 1000 (following the suggestion of Dr. John E. Rhodes¹) were made three times a week for two weeks into the tumor where it was visible through the right naris and upon lifting the soft palate. The total amount injected each time was from 10 to 15 minims. Because of the feeble general state of the patient and spells of giddiness which followed the injections, they have been temporarily suspended. The fact that the tumor has not grown during the past month and that the lateral motions of the jaw have returned may be due to the influence of the adrenalin.

While, as mentioned, there was nothing typical of a sarcoma in the microtome sections made from the original growth in September 1905, those made from the recurrence on the posterior pharyngeal wall a year later show tissue characteristic of a large celled lympho-sarcoma.

There are some unusual features in the history of this case that make it more interesting than that of the average pharyngeal sarcoma.

While the latter, especially when of the large-celled type, though not as welldefined as a benign tumor, is apt to remain fairly circumscribed and though growing into the tissues nevertheless to project mainly from the surface, the tumor presented by this patient has a diffuse growth and infiltrates the deeper parts out of proportion to its very moderate encroachment upon the cavity of the pharynx. This infiltrative character of the tumor did not show itself until its return after its removal a year ago, as the first appearance of the neoplasm, as described, deceptively resembled a large adenoid growth, had an entirely superficial character and occupied the site

¹ Dr. John Edwin Rhodes, Transactions American Laryngological Association, 1906; *Journal of the American Medical Association*, p. 173, 1906.

of the pharyngeal tonsil. On its recurrence, the morbid growth not only reproduced in part the tumor in the nasopharynx but directed its growth into the posterior pharyngeal wall, in this respect also occupying a region favored by outlying portions of adenoid vegetations. The character of the tumor had however changed and instead of confining itself to the mucosa as does a lymphoid hypertrophy it entered beneath it deeply into the submucous and muscular tissues behind and at the sides of the pharynx. The depth to which it infiltrates this region is shown by the patient's inability to rotate his head freely, to open his jaws more than half way, and by the fullness in the hollow behind the ramus of the jaw.

The limited rotation of the head is evidence of the penetration of the tumor to the vertebral column and is due to interference with the motions of the atlo-axoid joint, possibly caused by infiltration by neoplastic elements of the anterior longitudinal ligament of the cervical vertebrae and anterior occipito-atloid ligament and anterior atlo-axoid ligament. Interference with the functions of the rectus capitis anticus major and minor muscles may also help to prevent the free turning of the head. Instead of rotating his head in the normal manner by motions upon the axis the patient twists his whole neck around when he turns his head bringing all of his cervical vertebral column into play to take the place of the rigid atlo-axoid joint, and using the sterno-cleido-mastoid muscles which ordinarily do not contract when the head is rotated.

The difficulty in opening the jaw is caused by invasion by the growth of the raphe between the superior constrictor of the pharynx and the buccinator muscles and by the mechanical interference by the tumor with this tendinous band which extends between the pterygoid process and the lower jaw. Palpation shows the tension on this raphe when the jaw is opened. The inability to open the jaws is also in part due to infiltration by the tumor of the internal pterygoid muscles or inflammatory processes excited in them by its presence as it fills the pterygo-mandibular fossae in which these muscles lie external to the superior constrictor of the pharynx. An inability to open the jaw is not infrequently seen in carcinoma of the tonsil, palate or tongue but is then usually due to a different cause, namely the infiltration by carcinomatus tissue of the mucous membrane fold which passes from the spheno-maxillary fossa in the region of the hamular process to the angle of the lower jaw and is called by Mikulicz the intermaxillary fold. This fold is intact in the

case presented but the infiltration involves the internal pterygoid muscles immediately behind it.

The temporary inability to move the jaw laterally was probably due to transitory myositis and rigidity of the external pterygoid muscles caused by the irritating mechanical presence of the tumor in the pterygo-mandibular fossa. A number of cases of inability to open the jaw from affections of its muscles, especially of the masseter and temporal muscles, are reported, the cause, however, being interstitial myositis unconnected with a tumor.

The patient's difficulty in swallowing solid food can be accounted for by interstitial invasion of the superior constrictor of the pharynx by the growth, for the latter does not obstruct the cavity of the pharynx enough to interfere especially with deglutition although it somewhat overhangs the larynx.

For the symptom of constant and unvarying tachycardia presented by the patient I have found no explanation. It is not likely that it is due to pressure of the tumor upon the superior cervical ganglion of the sympathetic nerve which lies in the region invaded by the tumor behind the superior constrictor at about the level of the hard palate, for authorities agree that this ganglion furnishes no fibers to the accelerator nerve of the heart. Stimulation of the superior cervical ganglion mechanically would produce pallor of the side of the face involved, salivation and dilatation of the pupil. Suppression of its function would produce myosis and flushing of the skin of the ear on the affected side. None of these phenomena are present and the pupillary reflex is normal so that the classical evidences of interference with the cervical sympathetic by the tumor are absent. The tachycardia can not be explained on the ground of vagus paralysis for, if this were its cause, there would be paralysis of the vocal cords or at least posticus paralysis due to interference with the function of the recurrent laryngeal nerves, which at this level are contained in the vagus trunks..

The diffuse and deep nature of the tumor makes it obviously inoperable and therefore it seems proper to resume the injections of adrenalin or to adopt some other palliative treatment.

The histologic nature of the neoplasm is in accord with its location for its development has occurred in regions normally subject to hypertrophies of lymphoid tissue, the region of the pharyngeal tonsil and its outlying collections of lymphatic follicles upon the posterior pharyngeal wall, only in this instance instead of producing a

benign hypertrophy, the lymphoid cells have acquired a malignant tendency and penetrate the normal tissues. They may be seen collected in aggregations of large cells of a typically lymphoid appearance, these collections being contained in a wide-meshed connective tissue reticulum showing typical spindle cells in places.. The lymphoid cells possess each a number of processes..

In conclusion, I return thanks to Dr. John Gordon Wilson of the Department of Anatomy of the University of Chicago for his valuable advice concerning the anatomical points involved and to Dr. S. A. Mathews of the department of pharmacology of the University of Chicago for suggestions and assistance in looking up the physiologic questions.

288 E. Huron St.

The Paraffin Treatment of Atrophic Rhinitis. Prof. GUARNACCIA (Catane.) *Rev. Hebd. de Laryngol., etc.*, Oct. 15, 1904.

The author has treated eleven cases of atrophic rhinitis by means of the method of Gersunsky that is, by the injection of a preparation of paraffin to restore the atrophied organs to their normal contour. This treatment resulted in causing the disappearance of the offensive odor; and combined with alkaline washes repeated every two or three days, the patients were enabled to keep the nostrils free of crusts.

In cases in which the atrophic process has reduced the nasal cavity to a simple tube in which the pituitary membrane has lost its elasticity and there are numerous adhesions to the bony frame, it is of no avail to attempt this method. In doubtful cases there may be practiced what has been called the "adrenalin test". If the atrophic tissue under the influence of this substance shows a retraction, the paraffin may be injected, otherwise its results are unsatisfactory.

SCHEPPEGRELL.

OPTIC NEURITIS IN THROMBOSIS OF THE CRANIAL SINUSES AND INTERNAL JUGULAR VEIN; OCCURRENCE 30+% IN TWENTY-SIX CASES.

BY H. GLOVER LANGWORTHY, M.D., DUBUQUE, IOWA.

The connection between optic neuritis and intra-cranial disease has given rise to much discussion. In cases of tumor of the brain, the occurrence of a double optic neuritis is acknowledged as high and almost constant.

According to Knapp, papillitis is the most common symptom of brain tumor, being present in fully 80% of the cases. Strange to say the papillitis does not seem to depend upon either the location or size of the tumor.

In meningitis the symptom is also quite constantly present. DeSchweinitz¹ writes "of the four varieties of meningitis—simple, tubercular, traumatic and cerebro-spinal—tubercular disease of the brain is the most frequent cause of optic neuritis, the percentage varying from 76 to 81%."

With the foregoing statements as a working basis it is readily seen that an examination of the eye grounds is of the highest importance for the recognition of a number of diseases affecting the brain and circulatory system.

In considering the ocular manifestations of practically a third affection within the encephalon, namely an active thrombosis of one of the cranial sinuses, we would be led to expect a somewhat varying and yet fairly constant relation.

The table presented, of twenty-six cases of known thrombosis of the lateral sinus and internal jugular vein of otitic origin, shows how little however one can be guided by the absence of an abnormal fundus picture.

In nearly three fourths of the cases the diagnosis had to be made without the aid of any demonstrable ocular changes.

The finding of an optic neuritis in but 30% was a matter of some surprise as many of the cases were extremely severe with a lethal termination.

Tenzer², Harris³, Spicer⁴, McKernon⁵ and others have found small percentages: but its widespread recognition and confidence in such a low estimate when applied to the individual case is wanting.

No doubt the many diverse reports, some extremely high, others low, are responsible for a rather general "deferred opinion" as to the frequency of optic neuritis in these conditions.

It would seem that the careful study and tabulation of a comparatively few cases observed under the same conditions and by the same men would be of greater value than a rather indiscriminate complication from the reports of various authors.

Ordinarily, marked papillitis is followed by post neuritic atrophy. In the optic neuritis met with in thrombosis of the lateral sinus and internal jugular vein, the reverse, however, seems to hold good. Almost without exception the neuritis subsides and the disc soon regains its normal appearance with excellent vision. Crockett was among the first to point this out.

The following case (No. I) partly reported by Crockett⁶ is a rather remarkable example: A boy, V. T., eight years of age, was admitted to the Massachusetts Charitable Eye and Ear Infirmary November 5, 1904, on the service of Dr. E. A. Crockett, with a right acute otitis media with mastoiditis plus extra dural abscess. A few days later he developed thrombosis of the lateral sinus and internal jugular vein. Mastoid operation and ligation of internal jugular vein was performed by Dr. Crockett.

Nov. 9.—Fundi examined by Dr. A. Quackenboss. There was a double optic neuritis with hemorrhages into the retina.

Dec. 4.—The optic neuritis is seen to be rapidly diminishing. Hemorrhages remain, although less distinct.

July 30, 1906.—Almost two years later the fundi were normal in appearance with good vision. No contraction of the visual fields.

To illustrate that there is also no disturbance in vision or in the appearance of the optic nerve following curettement of the lateral sinus and ligation of the internal jugular vein, another case (No. 10) is presented: A young woman, W. F., twenty-five years old was admitted to the Infirmary on the service of Dr. C. J. Blake, June 12, 1905. She had a left acute suppurative otitis media with mastoiditis. Symptoms of thrombosis of the lateral sinus developed and the sinus was opened with ligation of the internal jugular vein (Dr. Mosher). The patient was in apparently a moribund condition. Fundi negative.

August 28, 1906—One year later fundi were still negative, normal vision and field.

One of the most interesting cases that I have ever seen occurred on the service of Dr. Philip Hammond. (No. 17.) A youth,

age nineteen, was admitted February 3, 1906, with a left acute suppurative otitis media with mastoiditis. He subsequently developed thrombosis of the lateral sinus and internal jugular vein. Both operations were performed by Dr. Hammond. Before leaving the hospital almost every joint on the opposite side of the body became the seat of septic synovitis. Joints drained by Dr. Lund. At times he was wildly delirious. Fundi negative throughout. Patient finally discharged to Massachusetts General Hospital for convalescence.

Zanfal is reported⁴ as saying "that an extension of the inflammation from the middle ear into the cranial cavity may be revealed at a time when distinct violent subjective symptoms, or other symptoms, are not yet present." This however, is seen to be erroneous as even the most fulminating cases often show no ocular disturbances and in milder cases where the jugular is tied early, none at all.

Crockett writes: "Among early symptoms, beyond chills and high temperature, which are nearly always seen, I think the most diagnostic is optic neuritis, which occurs much more frequently in thrombosis than in cerebral abscess or meningitis. It occurred before operation in two out of seven, and after operation in two more."

It is rather curious that this author should have found such a high percentage, over fifty-six per cent. I can but regard it as an anomaly. Deductions from such a small number must be suggestive rather than positive.

Before taking up the mechanism of the eye phenomenon, it is necessary to agree upon a rather vital point, namely: an optic neuritis should not be considered as present in these cases unless it is well marked. The true condition of choked disc is one not easily mistaken and would give us much more accurate data for statistics. The normal physiological variations are so great that some guide would seem necessary. Hyperaemia of the disc is not a neuritis. Slight hyperaemia in these cases is not of special value as a premonitory symptom of approaching inflammation or of inflammation existing farther back in the nerve.

Although a number of theories have been advanced as to the manner in which intra-cranial tumors cause an optic neuritis the matter is still more or less in dispute. Von Graefe supposed that owing to the increase of pressure within the cranium, an abnormal quantity was forced into the intervaginal space, producing a stasis of the papilla. Pressure naturally would have a greater influence upon the outflow through the relatively thin walls of the veins than upon the stiffer walled arteries.

TABLE I. SHOWING PERCENTAGE OF OPTIC NEURITIS IN TWENTY-SIX CASES OF THROMBOSIS OF THE CRANIAL SINUSES AND INTERNAL JUGULAR VEIN.

Taken from the Records of the Massachusetts Charitable Eye and Ear Infirmary.

Case No.	DISEASE.	OPERATION.	DATE.	SURGEON.	OPTIC NEURITIS.
1	R. O. M. S. A. c mast. Extra dural abscess. Thrombosis lateral and internal jugular vein.	Mastoid. Ligature of Internal jugular vein.	November 5, 1904. November 15, 1904.	Wales, E. DeW. Crockett, E. A.	Double optic neuritis.
2	L. O. M. S. A. c mast. Thrombosis of lateral and internal jugular vein.	Mastoid. Curetting of lateral sinus.	May 7, 1904. May 18, 1904.	Allen, J. H. Crockett, E. A.	Double optic neuritis, more marked on rt. side.
3	L. O. M. S. A. c mast. Thrombosis lateral and internal jugular vein.		June 18, 1904.	Blake, C. J.	
4	R. O. M. S. Ch. c mast. c cholesteomata. Thrombosis lateral and internal jugular vein.	Radical mastoid. Ligature of Internal jugular vein.	June 30, 1904. July 14, 1904.	Crockett, E. A. Crockett, E. A.	
5	R. O. M. S. A. c mast. Thrombosis lateral and internal jugular vein.	Mastoid. Exploratory lateral sinus.	August 6, 1904.	Plummer, E. M. Plummer, E. M.	
6	L. O. M. S. A. c mast. Thrombosis lateral and internal jugular vein.	Mastoid. Ligature of Internal jugular vein.	October 19, 1904. November 26, 1904.	Crockett, E. A.	
7	L. O. M. S. A. c mast. Thrombosis lateral and internal jugular vein. Pregnancy. Extra dural abscess.	Mastoid. Ligature of Internal jugular vein.	November 26, 1904. November 29, 1904.	Powers, G. H. Jr. Crockett, E. A.	Double optic neuritis.
8	L. O. M. S. A. c mast. Thrombosis lateral and internal jugular vein.	Mastoid and Ligature of Internal jugular vein.	December 18, 1904.	Crockett, E. A.	
9	L. O. M. S. A. c mast. Thrombosis lateral and internal jugular vein.	Mastoid. Ligature of Internal jugular vein.	January 12, 1905. January 22, 1905.	Blake, C. J. Crockett, E. A.	
10	L. O. M. S. A. c mast. Thrombosis lateral and internal jugular vein.	Mastoid (Blood clot) exposure of lateral sinus and internal jugular vein.	June 12, 1905. June 28, 1905.	Hammond, P. Mosher, H. P.	
11	L. O. M. S. A. c mast. Thrombosis lateral and internal jugular vein.	Mastoid. Exposure of lateral sinus and ligature of Internal jugular vein.	July 7, 1905. July 15, 1905.	Hammond, P. Hammond, P.	
12	L. O. M. S. A. c mast. Thrombosis lateral and internal jugular vein.	Mastoid. Ligature of Internal jugular vein.	August 6, 1905. August 10, 1905.	Tobey, G. H. Jr. Tobey, G. H. Jr.	

13	L. O. M. S. A. c mast. Thrombosis lateral and internal jugular vein.	Mastoid. Exposure of lateral sinus. Ligation of internal jugular vein.	August 13, 1905.	Webster, G. A.	
14	L. O. M. S. A. c mast. Thrombosis lateral and internal jugular vein.	Mastoid. Ligation of internal jugular vein.	September 29, 1905. October 5, 1905.	Plummer, E. A. Webster, G. A.	
15	R. O. M. S. Ch. c mast. Brain abscess. Thrombosis lateral and internal jugular vein.	Mastoid. Exploratory brain opera- tion. Curettement of lateral sinus.	October 15, 1905.	Webster, G. A. Plummer, E. W.	Double optic neuritis.
16	L. O. M. S. Ch. c mast. Thrombosis lateral and internal jugular vein.	Mastoid. Ligation of internal jugular vein.	November 21, 1905.	Lecompte, W. A.	
17	L. O. M. S. A. c mast. Thrombosis lateral and internal jugular vein.	Mastoid. Ligation of internal jugular vein.	February 9, 1906. February 14, 1906. February 14, 1906. February 21, 1906. March 22, 1906.	Hammond, P. Hammond, P. Lund, F. Lund, F. Hammond, P.	
18	L. O. M. S. A. c mast. Thrombosis lateral and internal jugular vein.	Mastoid. Ligation of internal jugular vein.	March 28, 1906. April 2, 1906.	Hammond, P. Crockett, E. A.	Double optic neuritis.
19	R. O. M. S. A. c mast. Thrombosis lateral and internal jugular vein.	Mastoid. Ligation of internal jugular vein.	May 19, 1906. May 22, 1906.	Knowles, W. K. Crockett, E. A.	
20	R. O. M. S. A. c mast. Thrombosis lateral and internal jugular vein.	Mastoid. Ligation of internal jugular vein.	August 25, 1906. August 31, 1906.	Webster, G. A. Mosher, H. P.	
21	L. O. M. S. A. c mast. Extra dural abscess. Thrombosis lateral and internal jugular vein.	Mastoid. Exploratory brain opera- tion.	September 2, 1906. September 5, 1906.	Mosher, H. P. Mosher, H. P.	
22	L. O. M. S. A. c mast. Thrombosis lateral and internal jugular vein.	Mastoid. Ligation of internal jugular vein.			

TABLE II. INCLUDING CAVERNOUS SINUS THROMBOSIS.

23	R. O. M. S. Ch. c mast. Facial paralysis. Thrombosis lateral and internal jugular vein.	Radical mast. Lumbar puncture. Exploratory brain opera- tion. Ligation of internal jugular vein.	February 3, 1905. February 27, 1905. February 27, 1905. March 6, 1906.	Lecompte, W. A. Lecompte, W. A. Jack, F. L. Mixter, S. J.	Double optic neuritis.
24	R. O. M. S. A. c mast. Thrombosis lateral and internal jugular vein.	Mastoid.	February 2, 1906.	Hammond, P.	Double optic neuritis.
25	L. O. M. S. Ch. c mast. Thrombosis lateral and internal jugular vein.	Mastoid.	April 27, 1906.	Walker, D. H.	
26	R. O. M. S. A. c mast. Thrombosis lateral and internal jugular vein.	Ligation of internal jugular vein.	July 16, 1905.	Tobey, G. L. Jr.	Beginning. Double optic neuritis.

Explanation: R—right ear; L—left ear; O. M. S. A.—acute suppurative otitis media; c mast.—with mastoiditis; O. M. S. Ch.—Chronic suppurative otitis media.

Deutschmann and also Leber held, that the optic neuritis was not merely a stasis but principally a distinct inflammation, caused by some irritating substance produced by the tumor being carried down to the nerve head.

Parinaud considered choked disc to be the result of an extension of the interstitial oedema of brain tissue through the trunk of the nerve to the papilla.

In reviewing all the facts presented one is led to believe that the condition is not due wholly to venous engorgement for the reason that venous stasis around the eye does not always produce it.

The best exposition would seem to be: A thrombosis of the lateral sinus and internal jugular vein causes an increase in pressure within the cranial cavity and subdural space, compressing the sheath of the optic nerve and resulting in an obliteration⁷ of the central vein.

The twenty-three cases presented include four of thrombosis of the cavernous sinuses with a fatal result. Death took place in one of the four patients before any changes were observed in the fundi. It is remarkable that such a condition as cavernous sinus involvement could exist without producing intra-ocular changes.

The following conclusions would seem fairly certain:

First. The frequency of optic neuritis is low (about 30%). In almost three-fourths of the cases the diagnosis must be made on other than intra-ocular changes.

Second. Even the most severe type of optic neuritis is not followed by post-neuritic atrophy but rapidly subsides with preservation of good vision.

Third. Cases in which the fundi are negative throughout the acute attack remain so.

Fourth. For optic neuritis to be considered due to the disease, it must be fairly well marked. All doubtful fundi should be accepted as negative.

Fifth. Optic neuritis when it does occur is a symptom of the highest importance.

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OPERATIONS UPON THE EAR IN TUBERCULOUS PATIENTS.

BY W. G. B. HARLAND, M.D., PHILADELPHIA, PA.

There are three operations that are occasionally called for in tuberculous patients with ear complications: 1. Incision through the drum membrane. 2. Removal of granulations and establishment of free drainage from the middle ear in cases with purulent discharge. 3. Mastoid operation.

1. Incision through the drum membrane is not often called for except when infection of the ear of a serious kind, such as influenza, takes place. In such cases early incision is, of course, always indicated. In simple catarrhal otitis media, so frequently present in tuberculous patients, no good is attained by incising unless there is marked bulging of the drum membrane or pain continues severe after forty eight hours of active treatment.

Theoretically the drum head should be incised when infection of the middle ear by tubercle bacilli has occurred. As a matter of fact, tubercles form on the drum membrane and break down without causing pain, and the physician is not aware of the presence of the local disease until, the patient complaining of tinnitus and deafness, he finds upon inspection discharge in the external meatus.

2. The removal of granulations and establishment of free drainage is often called for in cases of chronic tuberculous otorrhoea, especially when the mastoid cells are affected, as they frequently are. Although the tuberculous process is destructive and progressive it is not as rapid here as in the lung, and it is seldom that fatal results occur from intracranial complications if free drainage is maintained. It is of importance, therefore, to keep the middle ear free from polyps and other obstructing growths. The amount of curatting will depend upon the condition of the patient, much more active interference being justified when the general health is good. Aural polyps can be removed with snare, ring knife or forceps, and nitrate of silver 60 grain solution applied. If in spite of the above treatment, pain, tenderness, swelling and other signs of obstruction continue, the remains of the malleus and incus can be removed—not a difficult operation if there has been great destruction of the drum membrane. A more thorough curettement is possible if nitrous oxide or similar general anesthetic is employed. Even after the removal of the ossicles, granulations will still continue to form for a time, and will have to be removed.

3. The mastoid operation is required in acute mastoiditis, whether from tuberculous or other infection, if, after active treatment for 24 to 48 hours, the symptoms have not abated, and also is indicated in chronic mastoiditis when free drainage cannot be maintained.

The usual indications for operating are persistent pain radiating around the ear, tenderness over the mastoid, fulness and tinnitus, profuse or intermittent discharge, drooping of the upper posterior wall of the canal, and increase of polymorpho-nuclear leukocytes to 80% or over. Tuberculous patients usually bear the operation better than might be expected, though the surgeon finds it difficult to remove all diseased bone, the process being so far reaching. The operation is apt to be a prolonged one. An opening up and curettement of the tympanic antrum and mastoid cells is all that is necessary if the condition is acute. On the other hand a previous chronic otorrhoea will necessitate besides the above a breaking down of the outer wall of the aditus and curettement of the middle ear.

The operative wound is often slow in healing, and discharge through the auditory canal may continue indefinitely. As far as the life of the patient is concerned the operation does not seem to be much more serious than in non-tuberculous cases.

223 South 17th St.

Eustachian Catheterization through the Mouth, with a Report of an Illustrative Case. HUGO A. KIEFER (Los Angeles.) *South. Calif. Practitioner*, April, 1906.

The author considers Eustachian catheterization through the mouth a method not to be recommended for the ordinary run of cases, but that it is "too valuable an adjunct to be deserving of the extreme neglect that has been accorded it." Nasal catheterization of the ears is at times impossible owing to obstruction of the fossae.

The technique is not difficult, and can be easily acquired by any one skilled in the use of the rhinoscopic mirror. "The oro- and nasopharynx and soft palate should first be anesthetized. The patient then depresses the tongue, the surgeon manipulates the mirror with one hand, and with the other hand inserts the catheter into the Eustachian orifice." The catheter should be bent in a long curve at the distal end to almost 90 degrees from the shank. Withdrawing the mirror, and laying it aside, that hand can be used to compress the Politzer bag.

EATON.

SOME POINTS IN THE ANATOMY OF THE TEMPORAL BONE TO BE CONSIDERED IN CONNECTION WITH MASTOIDITIS FOLLOWING ACUTE SUPPURATIVE OTITIS MEDIA.*

BY J. HOLINGER, M.D., CHICAGO.

To open an empyema of the mastoid process without complications is one of the simplest surgical operations. The anatomical conditions are in short as follows: The pus gathers in one or several large terminal cells which often are covered by a thin plate of bone only. The first stroke of the chisel drains it, in case perforation did not previously give it an outlet under the periosteum. But here is the first difficulty.

Should you now curette? Certainly, if the bone is diseased. But if it is healthy, an anatomical and a physiological consideration gives the answer. The cells vary in size from a pea to a large hazlenut. They communicate with the central cell, called the antrum, but not with each other except through the antrum. They are lined with thin membrane, and act as reserve air tanks, for the middle-ear. In acute inflammation of another mucous membrane, say of the nose, would you curette the interior of the nose in an acute coryza? The only difference is, that in the cells of the mastoid the secretions are not drained. Why should you therefore destroy an acutely inflamed lining membrane which later on has to resume its function? We must follow up the cell we first opened to its origin in the antrum, whence a number of other similar cells emanate with their narrow necks. Their terminal enlargement might also be filled with pus.

I shall follow the plan of starting from the periphery and advancing towards the center just as we proceed in the operation. The next anatomical point in the periphery of our domain is the interesting relation of the mastoid cells to the surrounding diploe of the temporal bone. There is no dividing line between the two. An acute suppuration may penetrate the cells, advance between the inner and outer plate of the skull, and appear under the periosteum and skin in distant locations.

In 1894, in the Eye and Ear Infirmary, I opened an abscess over the occiput the size of half a hen's egg. The outer plate was per-

* Paper read before a joint meeting of the Chicago Medical Society and the Chicago Laryngological and Otological Society.

forated and I followed the discolored diploe chiseling a groove, which lead in a somewhat irregular line to a large suppurating cell in the mastoid process. Another much favored route of these suppurations of the diploe leads forward to the zygomatic process, and through it to the neighborhood of the eye. In some, though exceptional cases, the cells may extend that far.

Secondary demarkation and exfoliation of pieces of bone weeks and months after an operation may be the consequence, if we fail to trace these paths. Furthermore they may give an explanation for some distant abscesses of the brain, because such an over-looked focus in the diploe may perforate inwardly just as well as outwardly.

This leads us to endocranial complications in general. They are not as frequent by far in acute as in chronic suppurations and therefore I shall not lose much time about them. There are three main points whence they start which constitute the thinnest portions of the bony walls of the cells. They are often transparent in these places, even perforated to a smaller or larger extent. We find them on the roof of the drum-cavity and the antrum, secondly on the cells around the lateral sinus, thirdly at the floor of the temporal bone on both sides of the incisura mastoidea.

Extra-dural abscess, pachy-meningitis and brain abscess of the temporal lobe start from the tegmen tympani and antri. Extra dural abscesses, diseases of the sinus with pyaemia, pachy-meningitis and abscesses of the cerebellum emanate from the second area. What we call Bezold mastoiditis is extension of the pus into the fascias of the neck starting from the third point of least resistance, which is on both sides of the incisura mastoidea. At this very point, I must not fail to draw your attention to the location of the facial nerve which passes in a vertical direction through the deeper anterior part of those cells. It is very easily injured by promiscuously curetting.

We arrive at the antrum after finishing the periphery. The use of the curette must be avoided here for two reasons. Firstly, there is great danger of dislocating the short process of anvil from its attachment. Being detached it acts as a foreign body in the middle-ear. Secondly, because we expect that the acutely inflamed lining membrane should later on resume its function, and therefore must not be injured unnecessarily. These points based upon anatomical considerations are indispensable for good and quick results. As such I consider recovery within 2 to 3 weeks, normal hearing, and no suppuration. At the same time by doing as above stated we avoid injury to the facial nerve and posterior semi-circular canal, both of

which project from the medial side into the cavity of the aditus. It is not possible to injure these parts if you keep to the lateral wall of the aditus and antrum. The medial wall is very rarely diseased in acute mastoiditis.

Attention was drawn to another important anatomical point very recently. Permit me for better illustration to cite the history of a case.

A man examined about three years ago at the Alexian Brothers Hospital had the typical walk and speech of one who was under the influence of liquor. He assured me however that he had not touched any since the Friday previous, when he was seized with a severe attack of ear-ache. The next day, a paracentesis was done. Sunday, he was worse, complaining especially of headache. When I saw him Monday, I made a diagnosis of meningitis. Tuesday he died. At the post mortem we found streaks of pus along the blood-vessels on the inside of the dura of the base of the skull radiating from a yellow bag of pus in the dura of the posterior surface of the pyramid of the temporal bone the saccus-endolymphaticus. The pus had perforated into the labyrinth and followed the aquaeductus vestibuli. It has been advised to raise the dura of the posterior surface of the pyramid in such a case and explore the aquaeductus and the saccus endolymphaticus.

Finally, we have to say a few words about the individual variations, the racial variations and the variations at different ages. It is a fact that one individual has a great number of large cells in his mastoid, another only a few small ones, and others none at all. Between the extremes there are all the different transitions. It is hard to ascertain before an operation whether we shall have to expect large or small cells, or, as it is called, whether a mastoid process is pneumatic or not. There is one point which has been made and denied repeatedly. A few experiences have of late influenced me rather in its favor. The general form of the skull is of great value in the judgment whether or not we have a pneumatic process and especially whether the sinus and the dura come close to the middle ear and external canal. Long narrow skulls, dolichocephalic skulls have pneumatic processes oftener than brachycephalic or round skulls. In round skulls, the external canal is proportionately longer, that is the ear lies deeper. To make matters worse, we often find no cells at all so that the sinus and dura are very close to the external meatus, and the middle ear.

The differences in the development of the cells at different ages of an individual are equally great. In the new born, there is only a

small antrum and no cells. At the age of six there are cells of considerable size. So that between one and six years the whole system of cells develops.

Nothing was said about the bulb of the jugular vein and a number of other anatomical points. The purpose of this paper is fulfilled if I succeed in leaving the impression, that, while often a mastoid operation is nothing but draining a superficial abscess, we have no possibility of deciding in advance, what anatomical difficulties will present themselves in the course of the operation.

103 Randolph Street.

Just how to Manage Otorrhœa. F. E. BURGEVIN. *Kansas City Medical Record*, July, 1906.

The author mentions the persistency of purulent otitis media in spite of the ordinary treatment and then presents a method which in his practice has proved very successful in completely drying up such cases.

His method consists in cleanliness and the use of Glycozone. He begins by instilling a warm solution of peroxide of hydrogen in 25 per cent solution, and increases the strength daily until the pure drug is used. He recommends hydrozone as more economical, being twice as strong as other preparations. After the ear is thoroughly clean, which may require considerable time at the first treatment, a few drops of warm glycozone are instilled and the canal securely closed with cotton to remain *in situ* until the next day.

He advises a daily treatment, but claims to have had good results where that was impossible. The use of the syringe is condemned.

The method is not painful, and if a few drops of a warm 5% solution of sodium borate are first instilled, the slight preliminary stinging is avoided.

FACIAL HYPOGLOSSAL ANASTOMOSIS.*

BY JOS. C. BECK, M.D., CHICAGO.

Miss H., whom I presented to you last May and whose case I reported in full in the Laryngoscope (Page 658, August 1906) owing to the unusual pathological condition of the temporal bone I again present this evening to show the result of a neuro-plastic operation for the cure of a facial paralysis which resulted from the absolute necessity of removing all the necrotic bone involving the labyrinth. She is completely relieved of all her labyrinthian symptoms and severe headaches from which she suffered greatly before her first operation. Since I destroyed so much of the continuity of the nerve I did not expect any regeneration of the facial nerve, consequently did not wait any longer than six months to do this plastic operation. It is now $4\frac{1}{2}$ months since this last procedure.

TECHNIC OF OPERATION.

Usual preparation, general and local.

Instruments. Knives, artery forceps, Allport's retractors, Kocher's director and simple grooved director, anatomical forceps, tissue forceps, four strabismus hooks, two lid retractors, one slender curved scissors (enucleation) one blunt pointed slender knife, fine round edged needles, fine silk, needle holder, large needles for skin and other suture material.

Operation. 1. Incision, retro-auricular from about the middle of the auricle downward and forward along the anterior border of the sterno-cleido-mastoid for about four inches.

2. Dissect up the skin and subcutaneous tissues.
3. Dissect bluntly to the posterior border of the parotid gland.
4. Locate entrance of facial nerve into the gland.
5. Dissect nerve back to the stylo-mastoid-foramen.
6. Locate internal jugular vein under anterior border of the sterno-cleido-mastoid muscle.
7. Locate posterior belly of digastric muscle, loosen this up and retract upwards.
8. Loosen interior jugular vein and retract anteriorly.

* Read before the Chicago Laryngological and Otological Society, October 16, 1906.

9. So expose the hypoglossal nerve. It appears here in its forward course.

10. Follow it towards the tongue to be sure.

11. Remove all the sheath covering it at its nearest point to the facial.

12. Place sponge dipped in normal salt solution over this area and attend to the facial nerve.

13. Grasp the facial nerve and use gentle traction as though you wished to pull it from the stylo-mastoid canal.

14. With the curved slender scissors or blunt pointed knife cut the nerve as high as possible in the canal.

15. Trim up this cut end into a sort of a point so that the axis cylinders protrude from the nerve sheath.

16. Apply ligatures, principally through the sheath, two in number, through this pointed nerve end.

17. Make a small longitudinal slit, $\frac{1}{4}$ inch long, into the hypoglossal nerve sheath at the point where the facial nerve stump will fit in without any tension.

18. Separate the lips of this slit in the hypoglossal by means of a tissue forcep and implant the facial nerve stump into it in such a manner that it is turned upward to meet the central fibers of the hypoglossal, or rather to get the stimuli that come directly from the brain.

19. Suture the facial nerve stump to the sheath of the hypoglossal using very little tension on the sutures because strangulation is liable to follow.

20. One suture of the perinural areolar tissue of the hypoglossal is made over this anastomosis.

21. Reapplication of the structures to their normal positions.

22. Close the skin wound without drainage.

The above steps were carried out within one hour and twelve minutes including the anesthesia (nitrous oxide followed by ether.) I was kindly assisted by Dr. M. A. Goldstein of St. Louis, Dr. Fleming of Los Angeles, Dr. Owen of Chicago.

Primary contraction and reaction of the paralyzed side of the face followed the first 24 to 36 hours but disappeared afterwards. Otherwise primary union and normal recovery took place except a partial paralysis of the tongue and some little difficulty in swallowing.

No improvement could be seen for several weeks as to the motion of the face. The patient declared as early as the third week that she felt that side of the face getting stronger and food did not lodge in the inner side of her cheeks as often as before. The seventh week I found some contraction of the lower lip and about the eleventh week the same condition in the upper lip, a distinct crease, very similar to the normal condition. Three and one-half months after the operation, patient noticed while swallowing that the face moved on the paralyzed side and since then has acquired the habit of controlling this movement and somewhat disassociating it so that she may either contract the face when swallowing or swallow without contraction. The muscles of the eyelid and forehead have not yet recovered very much, although improved somewhat. One would not recognize the facial paralysis of this patient unless she were asked to close the eye or laugh. General tonics of strychnia and iron, exercises, massage and electricity have been continued constantly three to four times a week.

Gentlemen, I hope I may be pardoned for presenting this case before an entire cure has been effected but I shall present her with another similar case at some future time when I read a paper on the subject. Suffice it to say at this time that quite a number of cases are on record of neuro-plastic operations of the facial nerve and that at the present time the hypoglossal is chosen in preference to the spinal accessory or glosso-pharyngeal nerves. Stewart and Ballance, Taylor and Clark, Cushing and Fouret are the principal writers on the subject and they all report successful results.

1220 N. Clark Str.

A CASE OF TRAUMATIC LARYNGITIS WITH EVERSION OF THE LARYNGEAL VENTRICLE.*

BY JOSEPH H. ABRAHAM, M.D., NEW YORK.

G. Y., aged 37; admitted to Prof. Delavan's clinic, October 16, 1906.

History. Married 11 years. Father of 7 children; 3 living; first three and seventh miscarriages.

Denies all syphilitic history.

Ten years ago suffered from an attack of pneumonia. On his recovery, his physician diagnosed beginning pulmonary tuberculosis, and so treated the patient for a year and a half. Present physical examination of chest is negative.

Occupation that of a saloon keeper, and his average daily toil amounted to 15 hours. He drank every intoxicant, and was frequently under its influence.

Owing to business reverses on October 1st, he increased the daily quantity of spirits.

Monday, October 15th, while in a jocular state he visited his bowling club to engage in a friendly game. Shortly afterwards he entered into a spirited controversy with a fellow-member, and was invited outside, which invitation he accepted. In return for his kindness, he received a blow on the right side of his face, just in front of his ear, another just below the angle of the jaw on the right side of the larynx and several in the lower abdominal region and other parts of his body.

The following morning introduces another story. The patient noticed that he was bleeding from his nose, could not talk above a whisper, swallowing produced excruciating pain, and lastly, he complained of severe tenesmus, and, while casually looking into the commode, he noticed that the stools were bloodstained. The latter condition continued about a week, and may be due to his hemorrhoids or to the blow in the lower abdominal region.

Physical Examination. Situated superficially on the bridge of his nose was a small excoriation. A distinct ecchymosis on the right side of the larynx and several painful spots on his left shoulder and lower abdominal region.

* Read before the New York Academy of Medicine, Section on Laryngology and Rhinology, October 24, 1906.

On examining the nasal cavity, I found a slight abrasion of the mucous membrane on the lower anterior segment of the septum, which would account for his epistaxis. The mucous membrane of the pharynx was congested and very irritable. Mucosa of the larynx markedly inflamed and a distinct infiltration of the right ventricular band marked by a deep injection just below the aryteno-epiglottidean fold. Another ecchymotic spot was situated on the right arytenoid just below and posterior to the corniculum laryngis. Covering and completely obscuring the right vocal cord was an oval hernia-shaped tumor deeply injected, and which, on close examination, I diagnosed as eversion or prolapse of the laryngeal ventricle. Another remarkable coincidence was a somewhat similar eversion of the opposite ventricle of a lesser degree. The accompanying painting, executed by our assistant, Dr. A. Braun, beautifully illustrates the true conditions. From a professional and artistic standpoint it excels all previous work in painting pathologic laryngological specimens.

At present the patient has recovered his voice and is entirely free of dysphagia. With the laryngoscope it can be easily seen that the pathologic conditions have greatly improved under treatment. The ecchymotic spots have changed in color from a deep red to a bluish tinge; the eversion to a pinkish color, and greatly reduced.

Treatment. Appreciating the fact that intralaryngeal medication was contraindicated, I advised the patient to return to his home and bed, to discontinue the drinking of all intoxicants, and above all not to talk for two days, but write all requests; etc. Internally he was given sulphate of magnesia, 20.0 gms. to relieve the internal toxæmia. For the pain in his larynx tablets of orthoform were prescribed and locally ice compresses. On the fourth day, a 1% solution of alum was sprayed into his larynx and increased in strength daily until he could tolerate a 5% solution.

616 Madison Ave.

A SPECULUM FOR SUBMUCOUS RESECTION OF THE SEPTUM.

BY HARRIS PEYTON MOSHER, M.D., BOSTON.

Killian's long bladed speculum is of the greatest use in the operation of submucous resection of the septum. It has, however, one disadvantage. It is made of polished metal so that the blades, unless they are held perfectly true, reflect the light in such a manner



I. Author's Adjustable Nasal Speculum.

that the resulting glare is tiresome to the eye. This objection is done away with easily by making the blades fenestrated. In the speculum which I am now using the blades are made of wire. Thus they become skeleton blades, but they are sufficiently strong for the work which they are called upon to perform. The wire blades are not only fenestrated, but are adjustable so that any length of blade can be used. In addition one blade can be used shorter than the other. The use of one blade long and one blade short is a great

help in operating upon a perpendicular deviation of the septum which is placed well anterior. The short blade will hold back the anterior flap while the long blade will pass beyond the summit of the deviation and hold the mucous membrane aside as the elevation of the mucous membrane proceeds from that point backward. When two flaps are used, a short anterior flap and a long posterior flap, if the handle of the speculum is held horizontally instead of vertically the long blade will hold up the posterior flap at the same time that the short blade retracts the anterior flap. If the button-hole incision is used the speculum can be used in the same way. The long blade

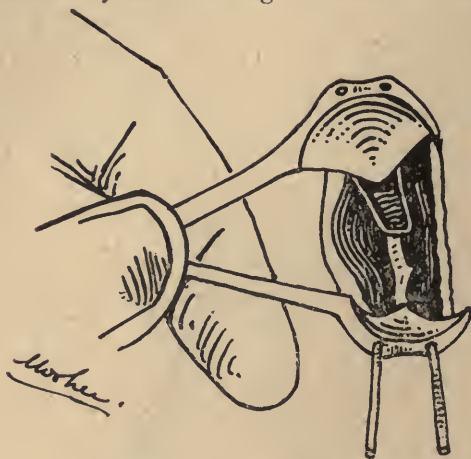


II. Author's Adjustable Nasal Speculum.

will hold the two flaps apart. When the deviation runs far back and sufficient spread is not given to the flaps by using the speculum in this manner, both blades can be adjusted and the speculum used as the solid Killian speculum is ordinarily employed. When the handle of the speculum is held horizontally and but one blade is used, it is easier to introduce the conchotome because it does not strike the solid sides of the mouth of the speculum.

At all times, the condition of the mucous membrane can be seen through the open wire blades without the necessity of withdrawing the speculum. If flaps are used the open blades allow the operator to see how well they approximate as he puts in his nasal packing.

The solid mouth of the speculum has a dull finish and the whole speculum is made light and with an easy spring in order to tire the hand as little as possible. As the cuts show, the speculum is simply the ordinary examining speculum with adjustable wire blades so that it is possible by withdrawing the wires to use the speculum



III. Speculum used with the Button-hole Incision.



IV. Speculum End with a Short Anterior Flap and with a Button-hole Incision beyond the Crest of the Perpendicular Deviation.

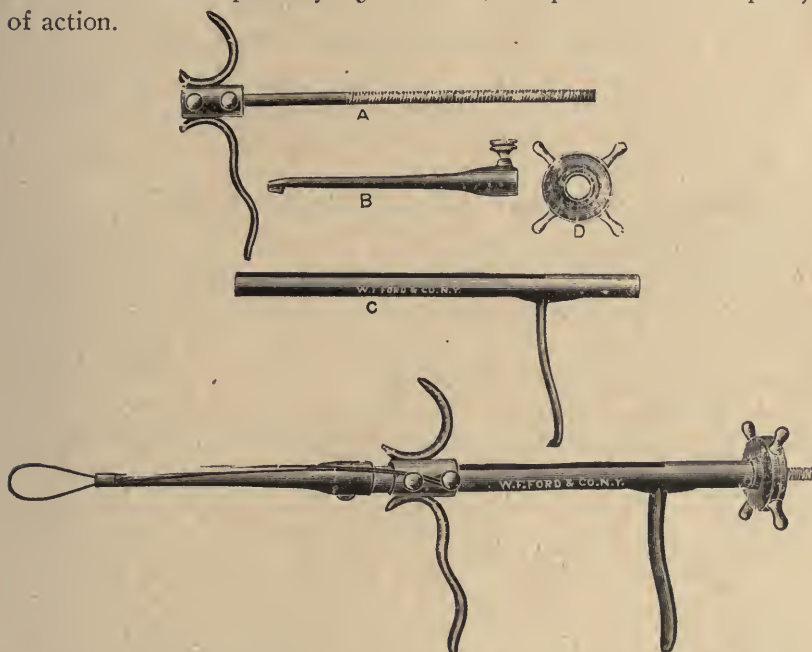
for the ordinary routine examinations. If one should prefer, he can have two sets of blades instead of the one set of long blades. Should the case require, the operator can bend either blade to suit the requirements of the special case. With the long blades the operator can have at will long or short blades as he may prefer, or he can have the familiar examining speculum which he employs daily.

A STRONG, SIMPLE TONSIL SNARE.*

BY HENRY PERKINS MOSELEY, M.D., NEW YORK.

The tonsil snare which is here presented is made of steel and has the following points of advantage:

1. Simplicity. 2. Strength. 3. Ease of wiring. 4. The same wire can be used repeatedly. 5. Ease of manipulation. 6. Rapidity of action.



The pistol grip enables great power to be exerted so that it is often unnecessary to use the wheel ecraseur. The cold wire snare is applicable to the removal of all variety of enlarged faucial tonsils especially if it can be easily manipulated. With a rapidly working snare the element of pain is reduced to a minimum. The practical absence of hemorrhage accompanying the use of the cold wire snare is well known. As there is no canula, the wire, after being drawn through the eye, can be pushed back and a new loop made, thus obviating the necessity of rewiring the instrument during an operation.

Ford & Co. make the instrument and have carefully carried out my directions.

616 Madison Ave.

* Read before the New York Academy of Medicine, Section on Laryngology and Rhinology, October 24, 1906.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY.

Regular Meeting, November 28, 1906.

T. PASSMORE BERENS, M.D., CHAIRMAN.

PRESENTATION OF PATIENTS.

Urticaria of the Larynx. By W. FREUDENTHAL, M.D.

Dr. Freudenthal said that he had presented this patient before the section eight years ago. The patient had first applied for treatment 15 years ago, complaining of vague symptoms in the throat which at times became more marked, so that he felt pain during eating and swallowing. Examination revealed a diffused redness of the laryngeal surface of the epiglottis with edematous swelling on the right side. The patient was treated for six or eight months, and then went to the country for a few months and returned perfectly well, and Dr. Freudenthal had been unable to make a diagnosis. Finally the man came back complaining of the sensation of a foreign body in the larynx, and a desire to pull it out. Examination this time revealed one or more herpetiform prominences with edematous surroundings. The picture changed very often, sometimes being a deep reddish color, and again pale, all in accordance with the erratic character of this affection. At the same time he mentioned that he was suffering from urticaria of the skin, and immediately this made the diagnosis very easy. The sensation of a foreign body in the throat with the desire to pull it out was produced by the itching of the prominent herpetetic eruptions. He also suffers from chronic constipation. As early as 1866 he went to Prof. C. of Buda-Pesth, who gave him some pills to act upon the bowels. This worked very well for a few years but then failed. After this the constipated conditions increased and then came the eruption in the larynx. Dr. Freudenthal said that he had watched the patient very carefully, and had seen no reason to change his diagnosis of eight years earlier. It was a case of chronic urticaria of the larynx.

the table with a view to performing a tracheotomy if necessary. The larynx was sprayed with adrenalin; but although this takes only a short time to act, the dyspnœa was so great that it was almost immediately followed by a hypodermic of 1-10 grain of apomorphine. This caused free emesis in two minutes. He was then given salt water to drink; this also was vomited. The urticaria was relieved almost instantly, so that he left the hospital feeling quite well about an hour after he came in. Dr. Carter said that he thought the quick manner in which this patient was relieved should give some idea of the prognosis, so as to avoid the too hasty performance of tracheotomy. It is generally conceded that urticaria is a reflex irritation, and if this is so it must be subject to the laws governing reflex action anywhere in the body. Physiological experiments and personal experience have demonstrated an inhibition of reflex action before the dangerous stage of asphyxia has been reached; and if this is the case when the blood becomes deoxygenated sufficiently to inhibit this, an automatic cure should occur and tracheotomy would seldom be required. He had seen two other cases in which the pillars and uvula were involved, which were relieved by giving apomorphine to produce emesis. This should be followed by a simple digestive mixture for a few days.

DR. FREUDENTHAL said that he had seen cases of urticaria affecting the buccal palate, but never one like that described by Dr. Carter, commencing with dyspnœa. The patient presented tonight had never had dyspnœa, but of course the fact that this was a chronic case might explain that.

DR. HARRIS said that the case he had expected to show tonight had made so much improvement that it was no longer sufficiently interesting to present. Several of the members present had examined the patient in the clinic, and could bear him out in saying that when the patient was first examined there was difficulty in deciding between the diagnosis of syphilis and tuberculosis. The patient had a clear syphilitic history and was suffering from pulmonary tuberculosis. All who saw the case agreed that the ulceration in the larynx was characteristic of syphilis. The patient was put upon anti-syphilitic treatment, iodide of potash, but not in large doses, and made a speedy and happy improvement. A week later there was very little ulceration remaining, and the diagnosis was cleared up.

Case of Foreign Body Removed from Oesophagus. By EMIL
MAYER, M.D.

Dr. Mayer said that the history of his case could be given briefly by reading the telegrams exchanged in regard to it.

The first, from Virginia, read as follows: "Have child, five-cent piece in gullet opposite fourth rib. Extraction failed. And sending it to you."

His answer to the specialist in Virginia (same day): "Inform me when I may expect patient. Send direct to my office."

From the father of the child (next Friday): "Patient will arrive in New York at 1 o'clock today."

From the father of the child to his physician (third day): "Coin successfully removed by Dr. Mayer in twenty minutes."

That is the story of a two-and-a-half-year-old child with a coin in the oesophagus, the coin being removed by the Kilian instruments without any operation.

DISCUSSION.

DR. CARTER said that he had seen a very interesting case on Sunday, where the foreign body was not removed from the oesophagus, and it might be of some interest to report it in this connection. He had been visiting a small town near the city when he was asked by one of the local physicians to see a case in consultation. It proved to be a man 59 years of age who, while eating a week before, had swallowed a large piece of chicken bone, a piece of the leg bone. The man was previously healthy and had never had any digestive disturbance, or any trouble with his stomach. Immediately after swallowing the bone he was seized with a severe pain. The doctor was called, who gave him a hypodermic of morphine to relieve his sufferings and then tried to push the foreign body down into the stomach with a large stomach tube. He was kept under the influence of morphine for 24 hours, and afterwards was put on liquid diet and advised to remain in bed. The man had soreness about the middle of the sternum for two or three days, and on Saturday night, one week after swallowing the bone, the man's wife telephoned the doctor that her husband was suffering severe pain and was bleeding to death. The doctor immediately went to the house and found the man had vomited a large basin half full of clotted blood. He was almost moribund, had a pulse of 120, respiration 25, and temperature of 98.6°. The doctor gave him a hypodermic of morphine to quiet him, and told him to keep quiet in bed. It was in this condition that Dr. Carter saw him. The hem-

orrhage had stopped, but he was still suffering considerable pain; was in profound shock and was almost exsanguinated. Dr. Carter advised rest in bed, morphine, cerium oxalate and sodium bicarbonate, and rectal alimentation. The question in this case was whether anything but conservative treatment could have been tried at the time; and also what remained to be done after the man recovered sufficiently to submit to some radical procedure.

DR. MYLES asked what was the exact position of the coin in Dr. Mayer's case, and also whether it was a counterfeit coin or a genuine one. (A genuine coin ought to have passed.)

DR. HARRIS inquired whether Dr. Mayer had used the ordinary Kilian lamp or one of Jackson's lamps, and also what sort of an extractor had been used. These cases are not so common, and the method of procedure was always interesting.

DR. FREUDENTHAL said that he would like to report a case very briefly, showing that a diagnosis of these cases is not always easy, and extraction surely not. The patient was a woman 25 years old, with a history of having swallowed a chicken bone two days previously in a restaurant down town. She had been taken to a hospital where attempts were made to remove the bone, but they caused her so much pain that she refused to have any further attempts made. Dr. Freudenthal said that he could not see anything with the fluoroscope, and the patient appeared to be so hysterical that he was not much inclined to believe her story. During the next two days this idea was increased, and the woman complained of pain in the stomach, back, shoulders, in fact, all over, and presented a typical picture of hysteria. On the tenth day she complained bitterly, and said that if she could only vomit once she thought it would help her. The suggestion was adopted and an emetic administered, and she vomited the chicken bone. In order to get a good picture of these cases it is best to give the patient an emulsion of bismuth, as this assists greatly in getting a shadow of the foreign body.

DR. NORTON L. WILSON told of a tin whistle and a five-cent piece removed from two children, one 8 years of age, the other 4, without the aid of the bronchoscope, but with the ordinary laryngeal forceps.

DR. MAYER said that he thought a careful examination of the œsophagus of Dr. Carter's case with the aid of the œsophagoscope would do much in locating the position of the foreign body. Replying to Dr. Myles' question, he would say that, in the case of his

little patient, the foreign body was located between the third and fourth ribs. In response to Dr. Harris' suggestion, he would say that the child had been sent to him by a laryngologist in Virginia, a very competent man, who was known by most of those present, who had made an attempt to remove the foreign body under general anæsthesia, but failed. The child was the niece of a physician, and it was distinctly stated to Dr. Mayer to either remove the foreign body without operation, or in case of failure the child would be operated on at home. The child was two and a half years old and had been playing with a coin the week before, when it slipped down the throat and stuck. The child could not swallow solid food at all. The parents brought with them a beautiful skiagraphic picture, showing just where the coin was located, so there was no question about the diagnosis. Without subjecting the child to any further examination, it was sent to the hospital, given its last food at 7 o'clock, with instructions that nothing, not even a drop of water was to pass its lips until the next morning. This was in order to prevent any possibility of emesis interfering with the attempt. The next morning at 8 o'clock the child was anæsthetized by a competent anæsthetist, the head was extended, and in the shortest possible space of time the œsophagus was entered. Then, using Kilian's light with the bronchoscopic tube, and using the extracting forceps that go with Kilian's set, such as all laryngologists have, the coin was grasped. The coin was movable, and was drawn slowly up through the narrow tube, with Dr. Yankauer standing ready to grasp it if by any accident it should slip while in the pharynx or mouth. Fortunately, however, it was brought up without any difficulty, and the child made an excellent recovery. The coin stood on edge about on a line with the cricoid cartilage, and if an attempt had been made to push it down it would in all probability have torn the œsophagus.

Myxo-Fibroma of the Nasal Cavity with Nasal Polypi. By J. M. MILLS, M.D.

Dr. Mills said that the patient had been referred to him a week ago with a history of catarrhal trouble from which he had suffered for fifteen years. For the last five years both nostrils had been much occluded. The patient complained much of drowsiness and marked stenosis. Examination revealed a growth in the post-naval cavity, from which a small piece was removed and sent to the pathologist for examination. The microscopic examination seemed to indicate a tumor of a fibrous character, but the history and appearance was

more suggestive of a mixed fibroma. The tumor involves almost the entire post nasal cavity, as far as could be determined from digital examination and the probe. Dr. Mills said that he thought the reason of the fibrous appearance in the microscope was that the specimen was cut from the periphery of the growth, and of course the mixomatous character decreases as you reach the surface. The important points in the history were the marked drowsiness of the patient for the last three or four months, and also some history of a carcinomatous tendency in two or three members of the family.

DISCUSSION.

DR. SMITH said that, from the appearance of the tumor, he would judge it to be quite vascular, and that its removal would probably result in considerable hemorrhage. If the surgeon hesitated on this account to remove it or was unable to engage it in a snare, that he would suggest the hypodermic injection of monochloroacetic acid into the tumor at intervals of a week, until it was reduced. This method had been successfully pursued by himself, and also by other operators at the Manhattan Eye, Ear and Throat Hospital.

Mixed Laryngeal Infection. By CARL E. MUNGER, M.D. (*Published in full in this issue of THE LARYNGOSCOPE, page 56.*)

DISCUSSION.

DR. MYLES said that the Section was indebted to Dr. Munger for his splendid picture of the objective symptoms which take place in infections of the larynx, infections of tuberculosis and syphilis. When the naked eye cannot make the diagnosis, the microscopical and bacteriological laboratory usually can. Dr. Myles said that he had wondered just what was meant by mixed infection. For we have streptococcus or pneumococcus and other infections of the larynx and sometimes they were not so destructive.

A second question is how far does cold air cure tuberculosis. In Dr. Myles' opinion, cold air cures tuberculosis just as cold air prevents the growth of the germs in the tube. To develop a culture of tubercular germs, we have to keep it in a warm place. If it were put out of doors it would not make much progress. This seems to be the ideal remedy for tuberculosis. Tubercular laryngitis has not a good prognosis, but the doctor thought a great many of these cases might get well if we acted more promptly in regard to removing the growths and securing for the patients plenty of good fresh air.

Dr. Myles said that he had found that 15 or 20 grains of potassium iodide taken for months had little or no effect on gummatous processes, but on giving doses of 80 grains the lid formations disappeared. In his experience the treatment with large doses had never failed, but in small doses it proved disappointing.

He himself had had two patients with tubercular germs who were syphilitic, but when we remember how frequently the throat is infected with tubercular germs in healthy people, we cannot lay too much stress upon this.

DR. CHAPPELL said that he felt especially grateful to Dr. Munger for bringing this somewhat difficult subject before the Section. During the past few years the expansion in Laryngology and Rhinology has taken place along surgical lines, and if the specialists in these lines expect the profession and laity to continue to believe that all the ills of humanity begin in the upper air passages they must cultivate the medical as well as the surgical side of their specialty. He had recognized two infections occurring with tuberculosis in the larynx, syphilis and streptococcus infection. In going over his notes he had made a diagnosis of 15 cases of syphilis with tuberculosis, five seen in consultation and ten under his own observation. It is very difficult to make a diagnosis between syphilis and tuberculosis and mistakes are often made. He recalled two typical cases which he had observed for many years as being absolute proof of syphilis and tuberculosis occurring together. One of these cases was a man with ulcerations in the larynx and pulmonary tuberculosis. The disease was arrested and the ulceration healed with the exception of two very small spots in the inter-arytenoid space. The man had gained 30 pounds in weight and was feeling well, but during this arrest he contracted syphilis. Eight weeks after the initial lesion he had a secondary syphilitic rash accompanied by an acute laryngitis tracheitis, pharyngitis and rhinitis, with mucous patches all over these surfaces. From being in almost perfect health the man began to be septic, his temperature went up to 103°-104°, and ten days after the mucous patches appeared he had an edematous condition of the larynx which often precedes the tubercular ulceration. In fact a week later small yellow spots began to appear over the surface of the whole mucous membrane of the larynx; and in spite of the fact that under antisymphilitic treatment the syphilis in the naso-pharynx and trachea disappeared to a great extent, the man died in three months from an acute tuberculosis.

In the other case, which was also observed for a number of years, the patient had a tubercular ulceration on the left arytenoid

cartilage, extending downward and accompanied with a great deal of pain. On one of his visits the man complained of increased laryngeal catarrh, and was told to come again the next day, as redness was observed on the other arytenoid. The man did not reappear, however, until ten days later, and then reported that he felt much better. Examination of the larynx revealed a large ulcer on the other arytenoid, and the one which had previously been diagnosed as tubercular had grown larger, but the pain was better. One of the most important points of diagnosis between syphilis and tuberculosis is the presence or absence of pain and the moment the patient said the pain was better, the suspicion of syphilis was aroused. On inquiry, it was found that some years before he had syphilis; and upon treatment with iodide of strontium the new ulceration healed rapidly and the old one contracted considerably.

Dr. Chappel said that he thought the cases he had diagnosed as mixed infection did better than the pure tuberculous cases. As to streptococcus infection, it had appeared to him that one might have an early streptococcus infection, with catarrh in the larynx and eventually become infected with the tubercle bacillus. Where there is a great deal of necrotic pulmonary tissue there is usually a quantity of mucopurulent expectoration, and in these cases, one might have a secondary streptococcus infection in the larynx. In his experience, these cases had been very hard to treat. Dr. Munger's paper was very timely, and would doubtless call attention to the possibility of a double infection.

DR. HARRIS said that he agreed with the last speaker in regard to the timeliness of Dr. Munger's paper, and wished to congratulate Dr. Munger upon the very clear picture he had drawn of combined tubercular and syphilitic lesions. He had this fall seen an unusual number of laryngeal inflammations and had been particularly puzzled in regard to the diagnosis of many cases; and knew of at least one member of the Section who had had a similar experience. Many years before, Dr. Rice had read a paper before the Section on the subject of mixed infection, and Dr. Harris said that he had borne this matter in mind in studying these puzzling cases. The picture he had seen was an unilateral inflammatory swelling of one cord. The false cord would overhang the true cord, and there was much bulging. In several instances, the patients had given a clear history of syphilis. In one case at present under treatment, the patient does not complain of any pain, but there is persistent hoarseness and an obstinate refusal to yield to anti-syphilitic treatment. He was inclined to believe that these unilateral infections

are always suspicious, but these cases that he recalled have almost entirely refused to yield to either local or general treatment. In connection with these cases and the subject of Dr. Munger's paper, he had looked up the remarks on the subject in the various text-books, and had been impressed with the scant attention they gave the subject. Sir Morell Mackenzie says very little about it, and makes no reference to syphilitic infiltration, though much is said about tubercular infiltration. There is, however, a distinct syphilitic infiltration, and we all recognize these cases of gummata which break down or yield to treatment, as shown by Dr. Munger.

DR. NORTON L. WILSON said that he would like to have the question of the administration of iodide of potash brought out a little more clearly. In his experience iodide of potash interfered very materially with the progress of the patient's health. In other words, a tuberculous patient when treated with iodide of potash rapidly runs down, and he thought that great care should be used in making a diagnosis between tuberculosis and syphilis before administering potash. In mixed cases, however, there might be some excuse for using the iodide of potash, for there the patient would not lose so rapidly as in cases of pure tuberculosis.

DR. MAYER said that in regard to the administration of iodide of potash in these cases, he would like to say that the neurologists lay much stress upon the fact that iodide of sodium is far superior in those cases where tertiary conditions exist, and it might be well to make note of this in treating cases of mixed infection. A short time since a man came into the dispensary at Mt. Sinai suffering from a great deal of dyspnoea. The appearance of the larynx by no means suggested tuberculosis, yet there were certain conditions which would lead to that diagnosis. Still, there was so much thickening about the folds of the cords particularly, that a diagnosis of tuberculosis was not altogether satisfactory. The man was referred to the department for internal diseases, and the report came back that his lungs were quite clear and showed no evidence of tuberculosis. The man was given iodide of potash in large doses and his dyspnoea became much better, and he was referred to the hospital for further observation, and this time they found full evidence of tuberculosis and a large quantity of tubercle bacilli. This was a clear case of mixed infection, as described by Dr. Munger's paper, where iodide of potash relieved a great part of the induration, and the tuberculous condition was also found.

DR. MAYER said that the picture of laryngeal phthisis was pretty well known, and when we do not see that clearly and there is a good

deal of dyspnœa, one begins to be suspicious of other things. In this case, he would say frankly that his own diagnosis was that it was a malignant disease, and he had referred him to the department of internal diseases with a question, to clear the case up. As Dr. Coakley had said, no matter how large our experience may be, we are compelled to withhold a diagnosis until a case can be cleared up, but one point about laryngeal tuberculosis is that almost invariably there is anaemia of the hard and soft palate.

DR. MUNGER, closing, said that the exhibition of the iodide of potash seemed to enter very largely into the matter of clearing up a diagnosis in these cases, but was by no means conclusive. In a case occurring in his own practice where there was no question of a diagnosis of both syphilis and tuberculosis (the patient had had hemorrhages, tubercle bacilli present, initial lesion of syphilis, and secondary symptoms) the lesion was absolutely unaffected by large doses of potassium iodide, although he had practically three teaspoonfuls of a saturated solution three times a day. He did not think that this question of diagnosis where we find traces of syphilis and tuberculosis had yet been definitely settled, and he thought that the point brought up by Dr. Chappell, that streptococcus has some bearing upon the question, might in a measure explain the character of the lesion rather than the specific explanation; but examination of the tissue showed that it was not tubercular, the exhibition of iodide of potassium had no effect, and we are still somewhat in the dark. He had very much enjoyed the discussion of his paper by such able men as had listened to it tonight.

BOOK REVIEWS.

Surgical Pathology and Treatment of Diseases of the Ear.

By CLARENCE JOHN BLAKE, M. D., Professor of Otology in Harvard University; and HENRY OTTRIDGE REIK, M. D., Associate in Ophthalmology and Otology in Johns Hopkins University. 8vo, 359 pages, illustrated. Cloth, \$3.50 net. D. Appleton & Co., New York, 1906.

While this work is an operative otology and as such does not consider those affections of the ear which have no surgical aspect or possibilities, those diseases which properly find place here the authors have treated quite completely, going into the etiology, pathology, symptoms, diagnosis, prognosis, the conduct of the case, and finally the operation.

In the introductory chapter on the surgical anatomy of the temporal bone, stress is laid upon the important structures which may become involved in the bone itself or adjacent to it, and upon those which have to be guarded during surgical interference.

The chapter on Aseptic Technique deserves especial praise. The authors do not attempt to give all the means of securing asepsis, but present a method of procedure which, if followed, will give to the surgeon the assurance that as far as asepsis and antiseptics in materials, instruments, the preparation of the patient, operator, and assistants, are concerned, he is above criticism. The pages devoted to anæsthesia are of general surgical interest, although particularly adapted to the otologist.

The diseases considered include those affecting the auricle and external auditory canal, the tympanic membrane, and the tympanum, and also the complications which may arise in suppurative otitis media, as mastoiditis, labyrinthine suppuration, brain abscess and septic meningitis. Adenectomy, subcutaneous and intravenous infusions, and lumbar puncture, are accorded a place as operations which may have to be performed by the aural surgeon.

In an appendix, much valuable detailed information is added: Buerker's statistics, showing the desirability of early paracentesis; an article on the localizing symptoms of brain abscess, prepared especially for this work by Waterman; Bourguet's method of exploration of the labyrinth; and other matters.

The chapter describing the mastoid operation is particularly full and the various stages in the operation are illustrated by original drawings. The method of using that recent development in mastoid surgery, the blood-clot dressing, is described with the necessary precautions to be observed in using it.

The whole volume is eminently practical, and will offer the experienced man some valuable suggestions and will lessen the difficulties to be overcome by the beginner. We can heartily recommend it to our readers.

B.

English Synonyms, Antonyms and Prepositions.

By JAMES C. FERNALD, L. H. D. More than 7,500 Classified and Discriminated Synonyms; nearly 4,000 Classified Antonyms; Correct Use of Prepositions, and Practical Helps for the Correct Use of Words. Fourteenth Edition. 12mo, cloth, 574 pp. Price \$1.50 net. Funk & Wagnalls, Pubs. New York and London.

Connectives of English Speech.

By JAMES C. FERNALD, L. H. D. The Definitions and Correct Usage of Prepositions, Conjunctions, Relative Pronouns and Adverbs explained and illustrated. 12mo, cloth, 334 pp. Price \$1.50 net. Funk & Wagnalls Co., Pubs. New York and London.

These two books are distinct and independent of each other, and yet are so related that they may well be considered companion volumes. While the author has considered the needs of a text-book for the classroom, he has included so much of value and has so arranged it for easy reference that they are really treatises upon the important parts of English Speech which they present, and form a valuable addition to the reference library of a speaker or writer.

W. B. Saunders Company, of Philadelphia and London, have just issued a revision of their handsome illustrated catalogue of medical, surgical and scientific publications. Beyond question this is the most elaborate and useful catalogue we have ever seen. The descriptions of the books are so full, the specimen illustrations are so representative of the pictorial feature of the books from which they are taken, and the mechanical get-up so entirely in keeping with the high order of the context. The authors listed are all men of recognized eminence in every branch and specialty of medical science. The catalogue is well worth having, and we understand a copy will be sent free upon request.

Cretinism and Deafness. J. HABERMANN. *Arch. f. Ohrenheilk.*, Leipzig, October, 1904.

Deafness in cretines may occur as a result of congenital malformation of the organ of Corti, but is more frequently caused by disease of the sound-perceiving apparatus in the brain itself; in many cretins, disease of the nose, throat and middle ear contribute no small part to the deafness.

YANKAUER.

THE LARYNGOSCOPE.

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ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding
that they are contributed exclusively to THE LARYNGOSCOPE.)

A NEW METHOD OF OPERATING UPON TURBINAL HYPERTROPHIES WITH A DESCRIPTION OF THE INSTRUMENTS AND THE TECHNIC OF THE INTRANASAL SUTURE.*

BY SIDNEY YANKAUER, M.D., NEW YORK CITY.

There are certain conditions affecting the middle and inferior turbinates that cannot be relieved without surgical interference: these are familiarly known to us as enlarged middle turbinate and hypertrophied lower turbinate.

The operative procedures upon the various forms of enlarged middle turbinate will be discussed on some other occasion; at the present time we will consider only those cases of lower turbinal hypertrophy in which the enlargement is due to organic thickening of the mucous membrane from hyperplasia of its connective tissue and glandular elements, in which its surface is thrown into folds and has a polypoid or mulberry appearance. The disease may involve the anterior end, the inferior border, the posterior end, the periosteum and bone, either singly or in varying combinations. In these cases, the function of the organ, in other words, its contraction and dilatation with the varying conditions of the surrounding atmosphere, is interfered with or destroyed, the drainage of the lower meatus is imperfect, the respiratory channel is obstructed, and a number of reflex and nervous symptoms are usually present.

For the removal of these hypertrophies a variety of surgical methods and instruments have been devised: the spoke-shave, the saw, the crushing forceps, the cutting forceps, the scissors, the punch, the snare. That the galvano cautery, used either by superficial cauterization or by ignipuncture, still has its adherents, is witnessed

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by the cases of synechia which we see with more or less frequency, resulting therefrom; but cauterization with the mineral acids seems to have been entirely abandoned.

It is an old rule in medicine that where there are many remedies for a condition, none of them is satisfactory; and if we examine these various procedures we find that they have one defect in common, namely, that each one of them leaves an open wound which must heal by slow process of granulation. In the case of the caustic methods, when the slough is cast off, a granulating wound remains, similar in all respects to that left after the use of cutting instruments.

That this slow process of healing by granulation is the true cause of all the disagreeable after-effects of even a partial turbinectomy will be evident from a brief consideration of the disadvantages and complications which have been reported as following this operation. Even when the nose is packed after the operation, hemorrhage from the dilated veins may be severe. When the packing is removed there is always some bleeding, so that repacking may be required. The removal of crusts and blood clots causes frequent small hemorrhages which continue during the entire course of the healing. True secondary hemorrhages, from sloughing of the ends of the blood-vessels, are said to occur in nearly one per cent of the cases. It takes several days before visible granulations begin to form, but even in favorable cases, where the granulations do not become exuberant or polypoid, epithelialization is not completed for several weeks, the time of healing, according to the latest reports, being from 2 to 8 weeks. During this time it is practically impossible to prevent infection of the wound. While this infection is rarely severe enough to cause general symptoms, it does cause increased secretion and crust formation, and delays the healing; it gives rise to an infiltration of the edges of the wound, which may remain as a permanent thickening and thus defeat the object of the operation, while if, in the endeavor to prevent this, larger portions of the turbinate are removed, the resulting loss of function is a cause of permanent annoyance. The wound always becomes larger than the excised portion of tissue, owing to the retraction of the cut edges of the mucous membrane, and when healing is finally completed after weeks of troublesome after treatment, there is left a broad, dry cicatricial surface, which is covered with squamous epithelium, a condition which should be avoided whenever it is possible to do so. Scar tissue is unfavorable to drainage, and that portion of the turbinate which is covered with the scar has permanently lost its function.

Now, in the present state of modern surgery, wounds made in a clean field, in other parts of the body, are not left open and allowed to heal by granulation, but the wound is sutured and healing by primary union is the rule. If proper asepsis has been maintained, the edges of the wound become agglutinated in a few hours, and in three days healing is practically completed. All the dangers and annoyances of the infected granulating wound are avoided, and to attempt to compare, or rather to contrast, the advantages of an aseptic sutured wound with the disadvantages of an infected granulating wound would be altogether too primitive. There is no reason why these surgical principles should not apply to the interior of the nose as well as to other parts of the body. The writer has, accordingly, devised and perfected a method of sewing up an intranasal wound, and has succeeded in demonstrating that primary union may be obtained in our operations upon the turbinal bodies, if we suture the wound after the excision of the hypertrophied parts.

It is perfectly feasible in actual practice to insert a suture into a wound in any part of the nasal chambers which is accessible to direct vision; upon the turbinated bodies, as far back as the posterior end of the inferior turbinate, and as high up as the anterior end of the middle turbinate. Each suture is closed by tying its ends together with a double or triple knot, as firmly, as securely and as accurately as it can be done upon the external parts of the body. Nor is this procedure a particularly difficult one; in fact in the anterior half of the nose, say within 4 cm. from the naso-labial junction, it is a simple and easy thing to do. It is accomplished with specially devised instruments which are few in number, very simple in their construction, and inexpensive, and by means of a novel technic which can be readily acquired by any surgeon. It is no more difficult to sew up a wound in the interior of the nasal passages than to perform any other delicate intranasal operation, and any one who can perform, for instance, a submucous resection of the septum, will be able to use the intranasal suture.

The cases which I have operated upon were selected from the material of the clinic at Mt. Sinai Dispensary by the chief of the clinic, Dr. Emil Mayer, with whom I am associated there. Dr. Mayer was also kind enough to assist me himself at most of the operations, and to inspect all the cases during the course of the healing and subsequently thereto.

There were altogether 14 cases of hypertrophy of the inferior turbinate. In 4 of these cases, the hypertrophy was limited to the anterior end; in 4 cases to the anterior end and inferior border;

in one case to the inferior border alone; in 3 cases to the inferior border and posterior end; in 2 cases, anterior end, inferior border and posterior end were all hypertrophic and polypoid.

The operation consists of two stages: 1st, the excision of the hypertrophied tissue; 2nd, the suture of the wound. It is performed in the following manner:

After the use of cocaine and adrenalin an incision is made with a knife above, and another below, the hypertrophy, the two incisions meeting at a sharp angle in front and behind. The included mass is then dissected out with elevators and scissors. Enough of the bone is then removed with punch forceps to bring the edges of the wound together. In some of the cases the entire mass, including the bone, was removed at one stroke with strong scissors, but owing to the retraction of the mucous membrane it was necessary to remove an additional strip of the bone. As the bone is very rough, especially near its inferior border, it is difficult to separate the soft parts in a satisfactory manner. The available scissors and punch forceps are also too thick and clumsy so that this part of the operation is tedious and consumes the greater part of the time. When the wound has been properly prepared, the edges are brought together with sutures. For this purpose number 0 catgut is used, sterilized by boiling it in a supersaturated solution of ammonium sulphate as described by Dr. Elsberg.* From 2 to 10 sutures were used, the average number being 5. The sutures were placed about one-fourth inch apart, beginning posteriorly and working forward. The nose was then packed with spunk impregnated with aristol powder.

The course of the healing was as follows: In a few of the cases there was oozing of blood-stained mucus through the dressing, but in none of the cases was there any hemorrhage. The packing was removed after 48 hours. As there was usually at this time some secretion, the patients were given a spray of Dobell's solution. When they returned on the following day, the secretion had disappeared, except a very slight amount in the immediate neighborhood of the sutures. On the fourth or fifth day the sutures were absorbed and their projecting ends discharged from the nose. On the sixth or seventh day all secretion had disappeared and the patients were discharged from treatment. In one case a fibrinous exudate, such as is occasionally seen after the use of adrenalin, appeared and remained for a week. That this exudate did not interfere with the healing was made evident when the patient presented herself on

* *International Clinics*, Volume 1, Eleventh Series.

the ninth day with the nose perfectly free and the wound healed. In a few cases the edges of the wound were not perfectly coapted. In these cases there were small areas of granulation between the sutures which took a few days longer to heal, the longest being 14 days. Yet even in these cases, the amount of secretion after the third day was so small that it is not perceived by the patient, and caused no discomfort or inconvenience. Nearly all of the patients could be discharged before the expiration of one week; and when we compare this with the slow and troublesome after treatment following the ordinary turbinectomy we are forced to the conclusion that the older methods are crude and primitive, but that the careful excision of the diseased part, followed by suture of the wound and primary union, is a precise, exact and scientific method of operating, which is in strict accord with the best principles of modern surgical technic. When I have seen these patients return on the fifth, sixth or seventh day, without complications, without blood, crusts or secretion, with the wound entirely healed and the scar almost invisible, with the turbinate covered with normal mucous membrane, and apparently functioning in a normal manner, these results appeared to be so eminently satisfactory that I have hastened to make this preliminary communication, in order that I might demonstrate the instruments and the technic which I have devised for the purpose of intranasal suturing, hoping not only that I may be able in the near future to give a more detailed account of a better technic in the first stage of the operation as the result of a larger experience, but also that the experience of others may the sooner be of benefit to us all.

The instruments necessary to pass and tie an intranasal suture are three in number. A needle, to thrust the thread through the mucous membrane, a hook to grasp and withdraw the thread, and the suture closer. To these may be added a fourth, the crotch-forceps, to steady the mucous membrane during the passage of the needle.

In order to suture a wound in whatever position it may occupy in the nose, it is necessary to have needles which will pass a suture in any desired direction. For a horizontal wound the suture must be passed vertically; for a vertical wound, horizontally; for oblique wounds, at right angles to the wound. The needles are shown in Plate 1, Figs. 1 to 7. Fig. 7 shows a straight needle, Fig. 6 a needle bent backwards, similar to the needle used by Killian to suture the wound after the submucous resection of the septum. These needles pass the suture in a horizontal direction, i. e., they suture a vertical

wound. Figs. 1 and 2 show curved or half round needles placed at right angles to the shank. They pass the suture in a vertical direction and are used for horizontal wounds. Figs. 3 and 4 show half round needles placed at an angle of 45 degrees to the shank; they are used to pass an oblique suture. Fig. 5 shows a straight needle placed at right angles to the shank; it is particularly useful for what will presently be described as the indirect suture. All the needles have the eye close to the point. The curved needles have a deep groove on the convex side, the concave side being smooth; this arrangement is intended to keep the threads separated. In the operation under consideration at the present time, the wound is horizontal; hence only the half-round needles placed at right angles to the shank are used. The other needles are useful in other procedures in which suturing may be employed. I have performed similar operations upon the middle turbinated body and the ethmoid cells. I have also operated upon three cases of perforation of the septum, by making a flap of one mucous membrane, bringing it down and suturing it in place over the perforation in the other. One of these cases was only partially successful, the other two perforations were completely closed. These operations will be described in detail in a subsequent article.

The hook, Plate 1, Fig. 8, was the subject of special study. The requirements of an ideal hook are: It must grasp the thread as it comes from the eye of the needle quickly, but must not grasp both threads nor cut into the thread. The thread must not slip down along the shank of the hook, nor escape its grasp. The hook must rotate in its handle, so as to be placed in any desired position, to correspond to the needle. It was practically impossible to reconcile these requirements. The various forms of hooks experimented with are shown in Figs. 8 to 14, but the one finally selected as the best is the double crochet hook, Fig. 8.

The suture closer consists of a ring placed on the end of a long slender shank, Fig. 15. Where the shank joins the handle, there is a half sharp ridge of metal at right angles to the shank; just behind the ridge is a notch, the bottom of which is at the level of the center of the ridge. The use of these parts will be described later.

The crotch-forceps, Fig. 17, is a slender forceps, the blades of which end in a U-shaped crotch. With this forceps the mucous membrane is grasped, and the needle passed through it between the prongs of the crotch.

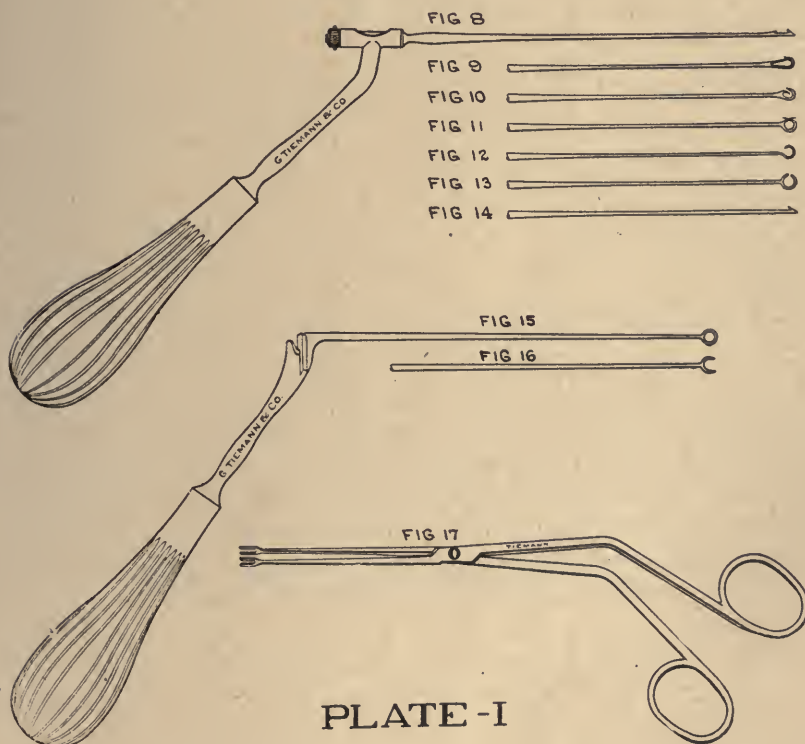
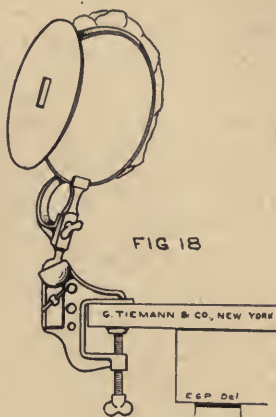
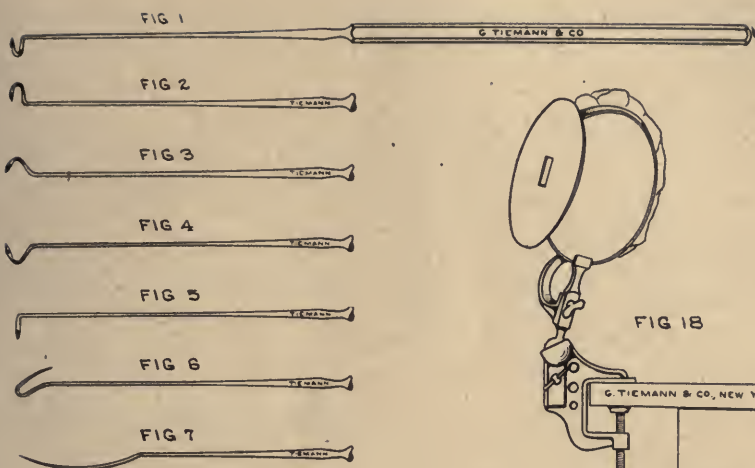


PLATE - I

To facilitate the study of the technic, the tying of the knots, etc., I have devised a small manikin, Fig. 18. This consists of a wooden frame in which a piece of gauze can be stretched. In front of this frame a circular plate of cardboard is fastened, which is perforated by an opening intended to correspond with the opening made by the self-retaining speculum. The whole is fastened to a table by means of a clamp with a ball and socket joint. The outline of the nasal interior may be drawn upon the gauze, or vertically or horizontally striped cloth may be used to study the various motions, the effects of perspective and foreshortening in the deeper parts of the nose, and to exercise the eye in the judgment of horizontal distances by the use of the accommodation, as is necessary in monocular vision.

The introduction of the suture. The needle is threaded with a suture about 18 inches in length. Just before using, it is held for a moment in sterilized water or carbolic solution, to soften the catgut. Whether the suture is passed from above downward or from below upwards, depends upon the condition of the flaps. It is generally best to pass the needle first through that flap which is the more movable, then bring the needle holding the mucous membrane up to the other flap, and then penetrate this flap. In this way the suture can be passed without the use of the crotch forceps. If, however, the flap through which the needle is first passed is bound down to the underlying tissues, it may be necessary to seize the other flap in the crotch forceps and bring it over the point of the needle. It is only in the last stitch or two that both flaps can be penetrated with one motion of the needle.

Grasping the thread. When the needle has been properly passed, the eye will project about $1/16$ to $1/8$ inch from the mucous membrane. If the two threads as they come from the eye of the needle are well separated, so that each can be distinctly seen, one of them can be seized with the hook without difficulty. Plate 2, Fig. 1. If one of the threads, however, has slipped out of the groove on the back of the needle, the two threads may lie side by side, and, owing to the blood or secretions, may stick to each other. To separate them, they are seized together in the hook and drawn down so as to make a double loop. If the assistant now draws gently upon one of the ends outside of the nose, one of these loops will straighten out, leaving the other distinct and separate. If the thread sticks to the side of the needle, it is best seized by using the side of the hook, which is specially designed for this purpose. The hook may be rotated

into the proper position by moving the pilot wheel at the end of its shank with the index finger of the hand holding the instrument.

Withdrawing the needle. As soon as the thread has been properly seized in the hook, the needle is withdrawn by rotating it backwards until it is free from the mucous membrane and withdrawing it from the nose. The hook during this time is kept close to the needle-puncture, to prevent the suture from tearing out. Fig. 2. If the assistant has kept the threads from becoming entangled, this is accomplished easily. These manipulations must be made continuously and the hook carefully watched during this part of the procedure, to avoid losing the loop.

Withdrawing the hook. As soon as the needle has been removed from the thread, the hook is withdrawn from the nose, bringing the loop of thread with it. One side of the loop is now drawn upon, so as to bring an end of the suture out of the nose. If the sutures are placed well back from the edge of the wound, and the mucous membrane is strong, the procedure may be facilitated by holding one end of the thread and allowing the other to run over the hook as it is withdrawn from the nose.

Making the slip-knot. When the suture has been successfully passed so that the thread passes through both edges of the wound and its two ends lie outside of the nose, without entanglement, a slip-knot is made as follows: The thread is adjusted so that about one-half of its length is outside of the nose on one side, the other end being correspondingly shorter. A simple overhand knot is now made near the middle of the thread and the short end threaded through the bight of this knot as shown in Fig. 3. The overhand knot is then closed until it binds the thread. We now have two ends coming from the slip-knot: one end may be distinguished as the knot-end, the other as the slip-end. When the overhand knot is drawn tight its bight will be seen as in Fig. 4 to stand crosswise, i. e., at right angles to the slip-end, and slip-end and knot-end come out of the knot on opposite sides of the cross piece, thus making a true slip-knot. If the end *a* Fig. 3 were passed through the overhand knot in the opposite direction, the two ends would come from the knot on the same side of the cross piece, and a granny slip-knot would have been made. A true slip-knot will bind tight when it closes down upon the tissues.

Closing the slip-knot. Having adjusted the slip-knot as shown in Fig. 4, it is brought up until it is near the nostril. The *knot-end* is now passed through the ring of the suture closer from the

left to right, as shown in Fig. 5; it is laid across the ridge and into the notch, and, with the finger of the right hand (which holds the suture closer) pressing lightly upon the thread, the instrument is moved along the thread until the ring is within an eighth of an inch from the knot. The finger is now pressed firmly upon the thread as it crosses the ridge; the left hand holds the slip-end, *a*, and, in this position, the suture closer is advanced into the nose and the knot closed. As the slip-knot closes upon the tissues, the ring of the instrument passes the stitch-hole, Fig. 6, and the knot is closed as tightly as necessary.

The safety knots. In order to prevent the slip-knot from becoming loose, it is advisable to make a true surgical knot, consisting of two overhand knots, above the slip-knot. When the slip-knot has been tightened, the end *a*, which has been held in the left hand, is allowed to lie across the palmar surface of the left and from left to right; as the suture closer is withdrawn from the nose, the end *b* is laid across the left hand from right to left, on top of *a*, as shown in Fig. 7. The first overhand turn of the surgical knot is then made as in Fig. 8, and it is brought up near the nostril, care being taken not to confuse the two ends. The end *a*, which is now in the right hand, is threaded through the ring of the suture closer from left to right, the instrument brought up near the knot, and both ends allowed to hang free. By a dexterous motion of the left hand, which can be acquired after a little practice, both ends are caught in the left hand in the manner shown in Fig. 9. By making slight tension upon the end *b*, and allowing the end *a* to be just loose enough, the overhand turn falls into the position shown in Fig. 9, the ring of the suture closer being about $\frac{1}{2}$ inch from the taut thread *b*. In this position the knot can be readily run up the taut thread. As the suture closer passes the slip-knot in the wound in the nose, this overhand turn lays itself neatly upon the slip-knot, and, by making tension upon both ends with the left hand, and with the suture closer, the knot is made as tight as is necessary. As the suture closer is withdrawn from the nose, the second overhand turn of the surgical knot is made by bringing the end *a* under the end *b*, making the turn in a manner the reverse of that shown in Figs. 7 and 8, bringing the end *b* to the right and through the suture closer. This turn is then tightened in the same manner as the first turn. In this way a true surgical knot is tied on the top of the slip-knot. The ends of the catgut are cut off close to the knot by means of any suitable pair of scissors.

The indirect suture. It occasionally happens that the suture cuts through one lip of the wound, or that the edges of the wound cannot be readily punctured with the needle at the same time, so that the suture is passed through one edge of the wound only. In such cases both ends of the thread are allowed to hang down from the nostril. The companion needle to the one used for this suture is now threaded with No. 1 braided silk, making a loop 18 inches long, and tying its ends together. This silk loop is passed through the other edge of the wound, and one end of the catgut is threaded through it, care being taken to select the proper end. The procedure is illustrated in Fig. 10. The silk thread is now withdrawn, carrying the catgut with it through the edge of the wound. If the mucous membrane is delicate, the crotch forceps is held against the needle-puncture, to act as a pulley over which the silk is drawn. The slip-knot and safety knots are now tied in the usual manner.

It is always difficult to describe the handling of cordage, and tedious to follow the descriptions; but if these knots are tied upon the little manikin above described, it will be found that the manipulations follow each other in a natural and easy manner. The sensation imparted to the finger which holds the thread by pressing it against the ridge on the suture closer is very similar to the sensation imparted by the thread in tying ordinary knots, and the whole procedure requires no greater adaptability or skill than any other surgical manipulation.

616 Madison Avenue.

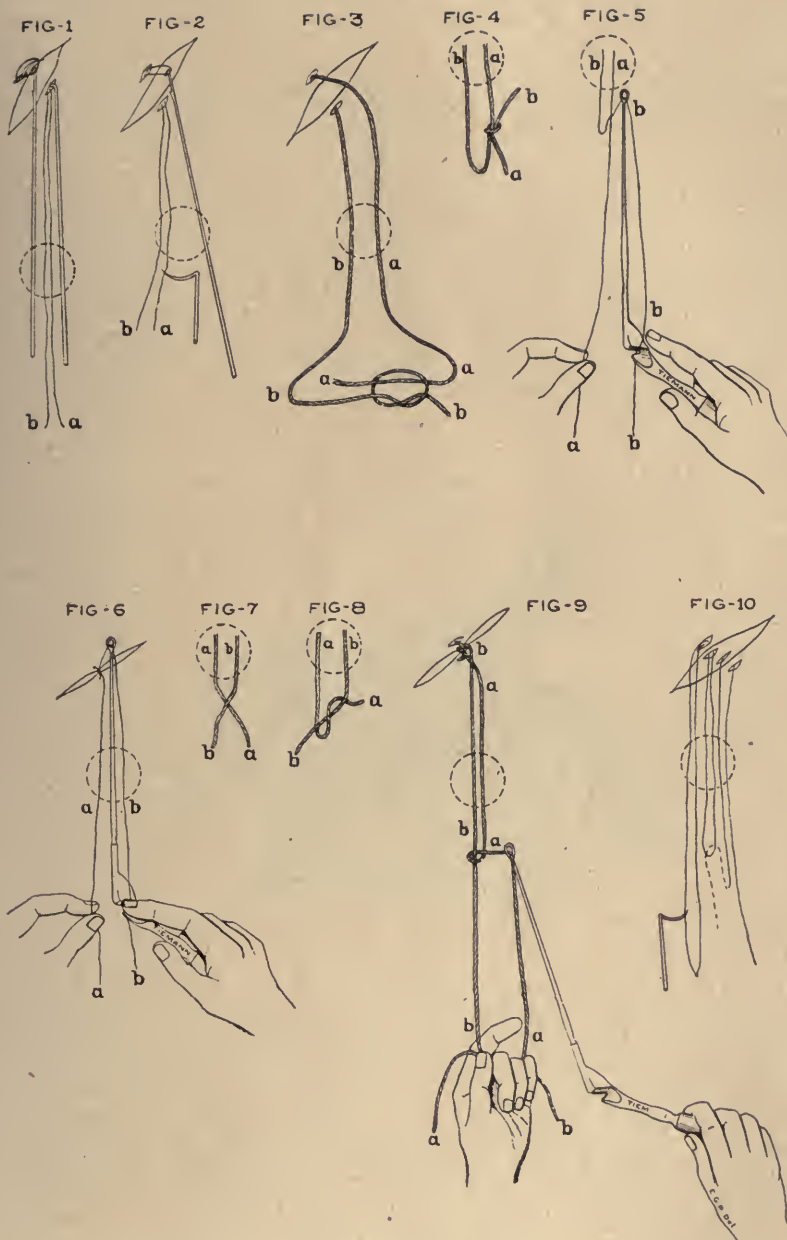


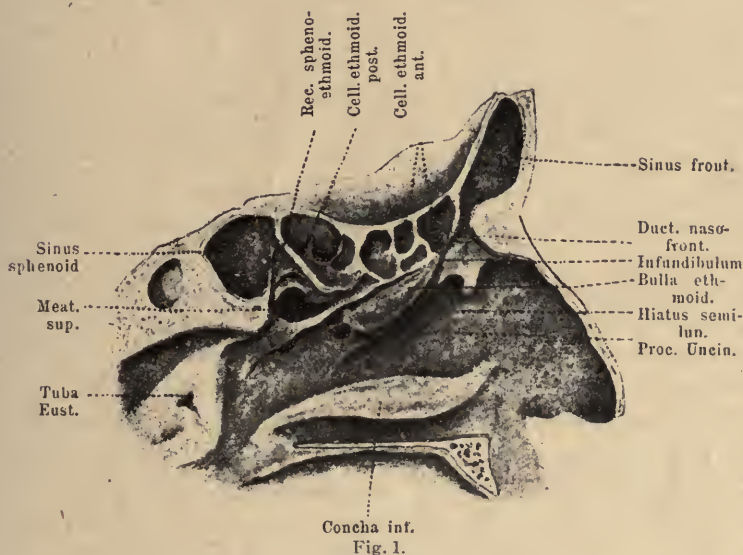
PLATE - II

The dotted circle denotes the opening of the nostril.

EXTERNAL OR INTERNAL OPERATION FOR SUPPURATION OF THE ACCESSORY NASAL SINUSES.*

BY MAX HALLE, M.D., BERLIN, GERMANY.

The extraordinary advances made during recent years in external operations for suppuration of the accessory nasal sinuses have led gradually to the employment of this measure in the therapeutics of chronic empyema in ever-increasing frequency, while a large number of rhinologists with surgical training have come to neglect more and more the internal treatment of such cases.



Permit me to lay before you my view of the matter, based upon eight years of work, and an experience gained from hundreds of cases of empyema.

Let us recapitulate briefly the anatomical conditions. (Fig. 1.) We recall that the hiatus semilunaris lies in the middle meatus. It contains, in the rear portion, the normal opening or ostium of the antrum of Highmore, in front of this the ostia of the anterior cells of the ethmoid bone, and still farther forward, in the infundibulum, those of the foremost ethmoidal cells and of the frontal sinus. The posterior cells of the ethmoid bone open into the superior nasal

* Read before the Berlin Medical Society.

meatus, as does also the ostium of the sphenoid sinus. Finally, in the naso-pharyngeal space, we find the Eustachian tube, serving as the ostium of the middle ear, which, I think, may be considered an accessory nasal cavity in a wider sense; for the ear is subject to exactly the same conditions as all other accessory nasal cavities, except that it has an elongated opening, and its lateral wall is membranous, not osseous.

We will call to mind that sinus empyema may be of dental or nasal origin, caused either by diseased teeth or by coryza, influenza, or infectious diseases. The therapeutics of empyema of dental origin, which can affect only the maxillary antrum, consists of the extraction of the infected tooth and subsequent treatment of the antrum, which will be discussed later. Empyema of nasal origin either heals spontaneously or becomes chronic. We will now consider the important question of how the cure of acute empyema is effected.

The diagnosis of empyema is arrived at chiefly by means of the pus which flows from the sinuses. It is a question whether we must imagine that the discharge from the maxillary sinus, for instance, is caused by the filling up of the cavity, so that the pus runs over necessarily, or on bending the head forwards, sideways, or backwards. In a number of cases it may be so, but it is hardly the rule. Opposed to it is the fact that if a cavity from which pus has been flowing freely, be tapped, very often no more than a very few drops of pus are found; seldom, at any rate, a quantity corresponding to the capacity of the cavity. Now, it might be that the pus is forced out by reason of the highly inflamed, greatly swollen mucous membrane. But in numerous cases of chronic empyema there is found on tapping only a moderately swollen mucous membrane, which does not greatly reduce the capacity of the cavity. There must, then, be another explanation of this phenomenon, and to my thinking it is to be found in respiration.

The passing of air in the acts of inspiration and expiration exerts, in accordance with purely physical laws, a continuous negative pressure upon the cavities. This negative pressure is increased with stronger inspiration and expiration, and especially through blowing the nose; so much so that by a strong blow pus in the liquid state can be expelled easily from the cavity and brought to the surface. The strength of the negative pressure can be demonstrated easily by having a patient whose antrum has been tapped through the alveolus take a deep breath. It can then be seen with what ease saliva or particles of food will pass into the antrum. In

a like manner, it may be possible to explain the observation made by Hartmann, that with energetic use of the Politzer bag pus will flow from the sinuses, especially if the ostia have been previously cocainized, and if the pus is thin. That air is forced into the cavities, and pus forced out in turn, is hardly a satisfactory explanation, for the air can escape with much greater ease through the choanae into the pharynx, or through the other side of the nose, and would even easily force open a closed velum palati, which, however, should be avoided in this case because of the danger of infecting the ear. On the other hand, it is quite comprehensible that a current of air blowing forcibly past the sinuses would suck out their contents.

The negative pressure of the air of respiration has, then, a permanently aspirating effect on the sinuses. This air also acts in another way. It is known that the air is saturated with moisture in the nose. It also draws moisture out of the more saturated air of the sinus, as, by diffusion, nature establishes an equal distribution of moisture in the air contained in both sinus and nose. Thus respiration serves to dry the sinus. At the same time, the well-known high disinfecting power of dry air is brought into play, so that we have these three agencies for the cure of empyema: (a) sucking out of the pus; (b) drying out of the sinus and shrinking of the swollen mucous membrane; (c) disinfection. These factors will operate especially well in a case where the respired air can pass through the nose without obstruction; while extended swellings, deviations, spurs, polypi, etc., in the nose will cause a less efficient respiration, and, therefore, less favorable results. In point of fact, empyema is found most frequently where respiration is thus interfered with, and in such cases generally on the less open side; and on the other hand, empyema is cured most quickly and easily where the nose permits of unhindered respiration. Taking all this into consideration, the spontaneous healing of acute empyema is quite comprehensible; and, in fact, a rapid and complete cure has been noted in a large number of cases under the above-mentioned favorable conditions.

It is apparent that we ought to take notice of the curative efforts of nature, and work along the same lines in the therapy of chronic empyema. The question is only: Can empyema of a chronic nature, that is, of at least half a year's duration, be cured without radical curettage of the diseased cavities? At this point, I might remind you of the generally known fact that chronic empyema of the middle ear, which, as explained above, may in a cer-

tain sense also be regarded as an accessory nasal cavity, may heal of itself after the removal of adenoid tumors, enlargements of the nasal mucous membrane, etc. The compression of the Eustachian tube and the inflammatory swellings disappear gradually, and suppurations of the ear which until then had defied all local therapeutics are often seen to heal in a surprisingly short time. The middle ear, however, is placed under very unfavorable conditions in this respect, as the numerous recesses, bone-cells, pockets and folds, formed by the ossicles and their ligaments, by nerves and vessels in the small space of the middle ear, must render the process of healing extraordinarily difficult.

We know, moreover, that chronic empyema may be cured if treated by means of continued irrigations through the alveolus. Therefore, a considerable degree of pathological change in the mucous membranes must be capable of recovery under favorable conditions.

If this in no wise rare possibility be conceded, we must ask ourselves whether the therapeutic methods heretofore in use create the most suitable conditions for healing.

MAXILLARY SINUS.

Let us start with the antrum of Highmore, which is the most frequently diseased cavity, and placed under the most favorable conditions. Here the attempt was made, at first, to effect a cure by boring through the alveolus (Cooper's operation), and long-continued irrigation. This method has the advantage that the cavity is easily accessible, and can be conveniently treated by the patient himself. It has also been considered of great importance that the cavity have an opening at the lowest point, as the pus can then flow off most easily. This, however, is the case only as long as the opening in the alveolus is unobstructed, that is, during the irrigation; at other times the aperture is kept closed by means of a metallic obturator, or the caoutchouc obturator specified by Herzfeld. And now we have again a cavity closed on all sides, and with the excretory duct at the highest point. As far as the cavity is concerned, it is absolutely of no importance whether the irrigation proceeds from the highest or the lowest point. It cannot be a matter of indifference, however, whether communication with the mouth is established, from where on account of the continued negative pressure of nasal respiration an unceasing, if only capillary, flow of liquid must be drawn into the cavity alongside the obturator. Moreover, the obturator itself must produce constant irrita-

tion, as its antral end is likely to be surrounded with numerous granulations which, on their part, cause or at least favor further secretion. And, lastly, the one or two irrigations daily, even with physiological salt solution, act upon the mucous membranes as a continually recurring stimulus for secretion. We have long since renounced frequent irrigation in the surgical treatment of all other cavities—I will remind you here only of empyema in the pleura—because we have come to the conclusion that, in general, irrigations are not favorable to healing. This measure is resorted to only when retention of pus is suspected. What is recognized to be of but little value in all branches of surgery, cannot be retained as justified in this field only. Again, continual drainage, the unobstructed flowing off of pus which is rightly insisted on in surgical practice, is on the one hand in no wise guaranteed by making an opening in the aveolus; on the other hand, the drying out and disinfection of the mucous membranes through respiration, which we consider an important factor in the process of healing, is permanently hindered. The only advantage which the alveolar method offers, the self-treatment by the patient, can be obtained as well or better in another way, as we will see later; and for these reasons I personally have refrained from using this method of operation for years, and do not think it commendable.

The intervention by way of the canine fossa is that method which makes possible a full survey of the cavity and a radical extraction of the diseased mucous membrane. In this way, tumors, sequestra, etc., can be diagnosed and removed. As a radical operation, therefore, this method will always be of value, and none other will be able to replace it. In other respects, however, it has all the disadvantages of the alveolar method in a higher degree. The opening into the mouth is very much wider, its closing up by means of obturators, cotton, etc., much less feasible; a continual irritation of the diseased cavity from saliva, mouth washes, particles of food, etc., is unavoidable. Various efforts have been made to meet these objectionable features; it has been attempted to line the entire antrum with epithelium; but until the present no altogether satisfactory results have been attained.

The operation of opening into the antrum through the lower nasal meatus, which was introduced by Mikulicz, and further developed by Krause-Friedländer, makes it possible to irrigate and treat the cavity from very nearly the lowest point. This method also permits the continuous drainage of pus, and, according to Hajek, this favorable effect is produced, that the mucous mem-

brane around the ostium shrinks considerably soon after the first irrigation, and thus facilitates a free discharge of pus by this passage. That the opening is not at the lowest point is of no consequence, as again the effects of suction must be taken into consideration. If the air can lift the pus up to the considerable height of the natural opening, it can surely do so more easily to the gap in the lower meatus.

This method, however, has the disadvantages that the permanent opening is very small, that the periosteum, which is only

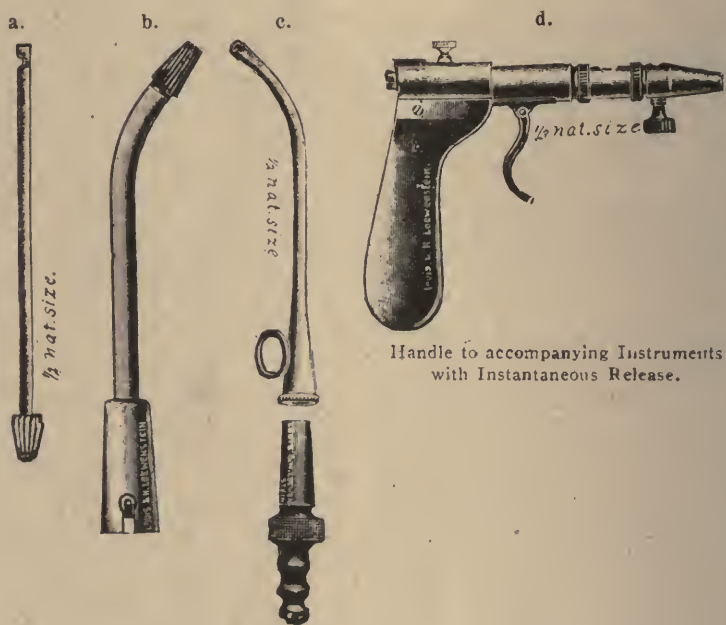


Fig. 2.

pierced, easily closes up again almost like a safety valve, that the after-treatment is rather painful, and that the patient requires the attention of the doctor for some time. However, the results obtained are on the whole satisfactory. I have seen numerous patients suffering from chronic empyema of the antrum of Highmore healed completely by this method. Still, the difficulties of treatment and the defectiveness of the permanent drainage made a more effective opening into the antrum maxillare seem desirable, and different authors have made numerous attempts to accomplish this. For several years, I myself have been using a trephine-drill

(Fig. 2a), an instrument which has a trephine point with a drill back of it. It is usually straight, but if the medial wall of the cavity bulges to the side or back I use a curved instrument (Fig. 2b). With this an opening of any desired size can easily be made. When the instrument has pierced the wall, I take a pear-shaped, blunt-pointed drill (see frontal sinus later; Fig. 3c), by means of which I can scrape down the medial wall in most cases to the bottom of the cavity. The after-treatment is carried out by means of a little tube bent like a catheter (Fig. 2c).

This operation offers the following advantages: Continuous mechanical drainage of pus is guaranteed, the suction of the air, the desiccation and disinfection of the cavity can take place without hindrance. Also, the patient can easily syringe and treat himself, if it is desired. The opening must not be made too small, as in that case it tends to become rapidly smaller and to close up again. The lower turbinated bone I leave intact as long as it appears to be normal. If the lower edge is in the way of the drill, I raise it well by means of a dressing forceps, so that the field of operation is left free. Thus the physiological structure of the nose is preserved as nearly as possible, and more favorable conditions for healing are secured. It is naturally of the greatest importance that all considerable deformities of the nose, such as deviations, crests, polypi, hypertrophies of the turbinated bones, etc., be carefully removed, or else the effective action of respiration cannot be brought into play. In spite of the fact that numerous authors have pointed this out, it cannot be called to mind often enough, for experience shows that again and again this principal demand is not regarded.

That it must indeed be the continued suction of the air which draws out the pus, is proved also by the fact that in spite of the large opening in the lower meatus, out of which the matter could easily be discharged, it is seen to flow as well out of the natural opening, by which the air is believed to pass with greatest force. Conversely, this phenomenon is an evidence that at this point there must be the strongest current of air. Though, of course, it must be noted that in the action of blowing the nose, the air, because of the large artificial opening, is easily forced into the cavity, and might eject the pus in this manner.

The after-treatment consists of infrequent irrigations (every 8-14 days), blowing through of dry air by means of a thick catheter-shaped tube, and the occasional dropping in of alcohol, protargol, or argyrol. The insufflation of powder I have long since completely discarded.

My experience with this method is most satisfactory. A large percentage of the patients is permanently cured. Those who still have a slight amount of secretion generally decline further interference. But even in cases where, on account of the persistence of a copious discharge, I have resorted to an operation by way of the fossa canina, I have often not been able to find anything more than a few granulations, and after their removal the suppuration did not decrease in the least. In a few cases, where both cavities were diseased, I have treated one only from the nose, the other because of long continuing suppuration from the fossa canina and the nose, but have not accomplished much more with the latter method. That others do not have extraordinarily favorable results by operating from the fossa canina, would seem to be proved by the patients I have seen in my work as assistant and student in many other dispensaries; one proof among others being also the work of Gerber, who now approaches the antrum almost entirely by way of the nose, though, in point of fact, from the middle meatus. This, to me, does not seem practical; in the first place, because the hiatus semilunaris is situated very close to the orbit, which might very easily be injured during an operation, and, secondly, because the drainage of pus is much more difficult from there, and the treatment by the patient himself, which is often desirable and even necessary, cannot well be managed. In the rare cases where I have made an opening by way of the middle meatus, my experience was less satisfactory than with the broader opening from the lower meatus. At any rate, Gerber lays great stress upon intranasal therapeutics in empyema of the antrum, and he has gotten away more and more from the method of Küster, which he formerly used.

I have never met with considerable difficulties in the above described operation. If the operator exercises some degree of care, and if the opening, in accordance with the object in view, be made near the root of the lower turbinated bone and then extended toward the bottom, only extremely rare anomalies should cause any technical difficulties worth mentioning.

From the large opening which has been established, the operator can survey the cavity in part; and eventually, after the insertion of a long tube, he can form a reasonably certain opinion of the pathological changes in the mucous membrane.

If the intranasal method produces good results under the very unfavorable conditions of the antrum of Highmore, it must offer a good working basis for the therapy of other cavities as well.

SPHENOID SINUS.

Let us next consider the sphenoid cavity, whose ostium is likewise situated rather high up, mostly about on the border between the upper and middle third. Here it is easy, after the removal of the posterior portion of the middle turbinated bone, to attack the anterior wall of the cavity, to establish a more or less large opening, which is kept open according to need with tampons and trichloroacetic acid, and by means of which the pus can be drawn off without difficulty, as from the antrum. If the pathological changes are of a high degree, so that the ordinary opening is not sufficient, the whole anterior wall can be removed, and it must only be borne in mind that because of the proximity of the hypophysis cerebri to the upper wall, and the sinus cavernous to the lateral wall, great carefulness must be exercised at these places. For this operation, I use a plain chisel, Cholewa's, and a hammer, and for the removal of the lowest and very hard portion of the anterior wall, a blunt-pointed drill (compare the operation on the frontal sinus later; Fig. 3c), by means of which the cavity can easily be laid bare to the bottom. If it is thought desirable to undertake the removal of the mucous membrane and the obliteration of the cavity, this is now possible without any considerable difficulty.

ETHMOID SINUS.

Empyema of the cells of the ethmoid bone, likewise, rarely offers extreme difficulties for intranasal operation. Of course, on account of the numerous separate cavities, an extensive opening-up or removal of the separate cells, and the creation of a single large cavity, will have to be undertaken, to provide conditions favorable to a perfect cure. After that, however, it will generally be possible, in one or several treatments, to open up all or nearly all of the diseased cells also from within, and to effect a cure. Only the most anterior cells are sometimes more difficult to reach, and we will consider their therapy when we come to speak of the treatment of empyema of the frontal sinus.

FRONTAL SINUS.

The only cavity which so far has seemed rather inaccessible to internal therapy is the frontal sinus. To be sure, a number of attempts have been made to approach this cavity also by way of the nose. I remind you of the attempts of Schäfer to provide an outlet for the pus by forcing a heavy probe up the front of the nose; also of the work of Hajek and Grünwald and others, who have

removed the anterior portion of the middle turbinated bone, probed the cavity, and irrigated it by introducing a canula. Worthy of notice are the interesting experiments of Scheier and Spiess, who have made use of the Roentgen rays for investigating and safeguarding the procedure of opening the sinus by means of the drill. However, a fairly reliable method of conveniently exposing the frontal sinus from the interior has not been found. Ingals, indeed, has announced a way to make a broad opening into the cavity from the nose. He introduces a probe into the frontal sinus, slides a flexible drill upon the probe and, pulling the probe forcibly to the front, he removes the anterior wall and the floor of the sinus. With this method the following anatomical conditions must be considered: (See Figs. 1 and 2.)

The drainage duct of the frontal sinus borders toward the back directly or almost directly on the tabula interna of the frontal bone, toward the side directly or nearly so on the lamina papyracea of the ethmoid bone. In front of the duct a large spina naso-frontalis interna is seen to project, which forms part of the floor of the frontal sinus. This spina naso-frontalis could be taken away without danger, and a broad duct procured, if it were possible to remove only this spine with an instrument, without injuring the tabula interna and the lamina papyracea, and thus endangering the dura and the orbit.

In the first place, it is a question whether the naso-frontal duct can be probed in a living person. That this is possible in many cases, especially after the removal of the anterior portion of the middle turbinate, would seem to be sufficiently proved. In cases of chronic empyema, where the pus has been active for some time, the excretory duct has generally become large enough to admit a probe without difficulty.

Regarding the more exact anatomical relations and the technique of the probe, I might at this point refer to the excellent dissertations of Hajek. I will only recapitulate briefly that the naso-frontal duct generally opens into the hiatus semilunaris or medially to it. If several ducts are to be explored in front, it will be found that the duct from the hiatus semilunaris leads usually into one of the anterior ethmoidal cells, and the one medial to it into the frontal sinus. Without desiring to enter more closely at this point into the difficulties of differential diagnosis, it is my belief that in supposed chronic empyema of the frontal sinus it is possible in the greater number of cases to introduce a probe into the cavity of the frontal bone without difficulty by following the outflow of pus. If,

however, a flexible drill is slipped onto the probe, this drill, even though pulled ever so strongly to the front, is very likely—in view of the anatomical conditions as above set forth—to injure the tabula interna, and by so doing to endanger the life of the patient; and for this reason I consider Ingal's method too dangerous to be recommended.

Myles's method might be mentioned. He proposes to remove the floor of the frontal cavity from the cells of the ethmoid bone by means of a hook-shaped chisel with a sharp lower edge. But this, too, seems to offer no guarantee whatever, as is easily apparent from a consideration of the anatomical relations. I have thought, therefore, that another course should be taken.

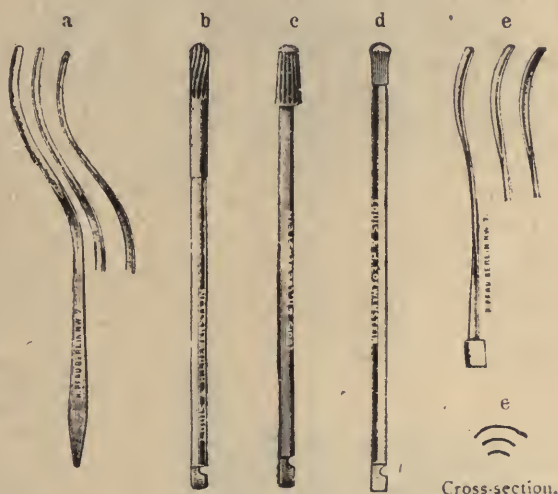


Fig. 3.

I introduce a probe as high as possible into the frontal cavity. Over the probe, I slide a protector of soft, flexible metal somewhat in the manner that Stacke guides his protector into the attic, which adjusts itself to the tabula interna posteriorly and to the orbit laterally (Fig. 3a). After that, I remove the probe. If I now advance with a bore-drill worked by electricity (Fig. 3b) immediately alongside of this protector in a forward and upward direction, taking care to keep always close to the protector (Fig. 4), I can go upward to the front and center without any danger at all¹, and open the floor of the cavity, which is formed by the spina nasio-frontalis, to such an extent that I obtain an opening sufficiently large to admit a drill with a blunted point (Fig. 3c). The

¹ The instrument is to be always pressed firmly to the front.

sharp instrument is to be used only up to this time! When this is achieved, I can easily and, because of the carefully rounded, polished point of the drill, without danger to the tabula interna, enlarge the opening sufficiently to introduce into the cavity a



Fig. 4.

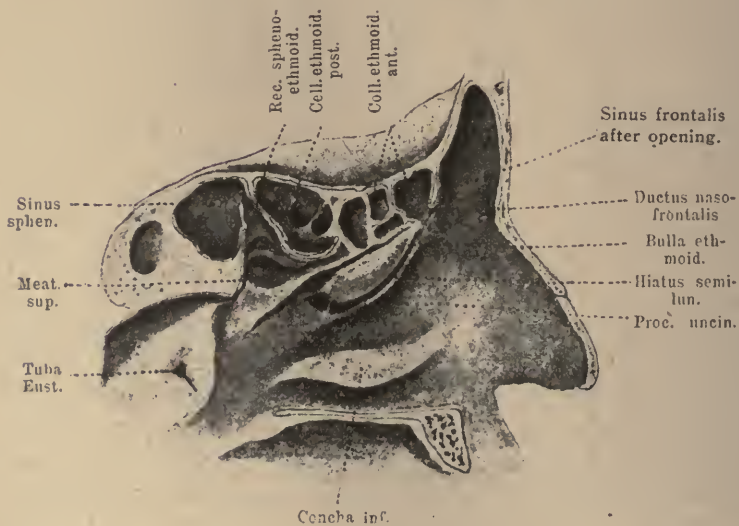


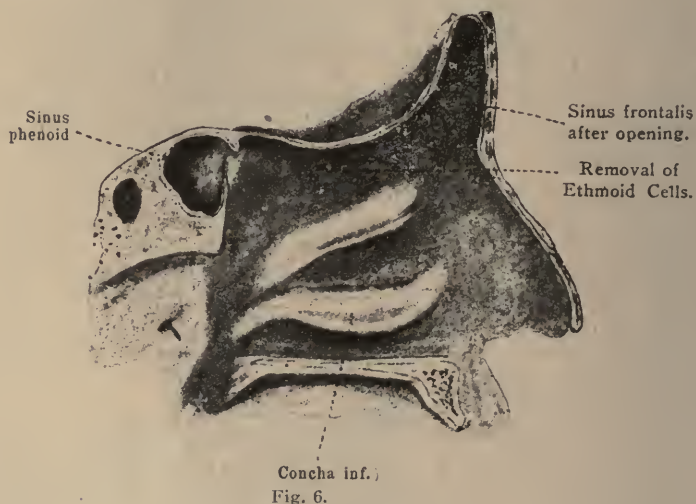
Fig. 5.

pear-shaped drill, whose thickened portion is carefully rounded off and polished. With this instrument, no dangerous injuries can be caused, provided the least care is taken. The entire floor can be drilled away with it, and so large a part of the tabula externa

ossis frontalis in a downward direction that the instrument can be felt from without, and that the opening of the frontal cavity towards the nose becomes almost as large as the distance of the nasal base from the tabula interna. Of course, it is necessary to take the precaution that the assistant pushes his finger well into the orbit, so that he can control the head of the instruments and prevent the drill from going too far to the front or side. If the cocaineization is done with care, and plenty of adrenalin used, the operation can be performed practically without pain and under constant control of the eye; *and it must be performed under constant control of the eye.* On no account should the operator work in the dark, forcing the drill blindly upward, but he must be able to overlook the field of operation closely at all times. In this way, the cavity can be opened to such an extent that it is possible to gain a complete survey of the mucous membrane and those lateral portions of the frontal cavity that are at all within the reach of the eye, so that the operator can acquaint himself sufficiently with the condition of the mucous membrane, the formation of polypi, etc., and get some information that might be of value in case an external operation should be required later. It is also quite practicable, if necessary, to reach and remove diseased mucous membrane, granulations, etc., at quite a distance from the operative opening by means of flexible curettes and sharp spoons. With suitable chisels (Fig. 3e), small, troublesome bony protuberances can easily be removed.

I have demonstrated this operation on numerous preparations, a number of which I am bringing before you to prove how unexpectedly large this opening can be made. In fact, by having the tabula interna securely in sight, all the ethmoid cells to the sphenoid cavity can be conveniently and safely evacuated by using double curettes, etc. (Fig. 6, which has been made from a preparation). On living persons, I have performed this operation so far twelve times in ten cases, that is, twice on both sides, seven of which I present to you today; the others could not be here either because of the distance or other irrelevant reasons. I have never experienced any difficulties worth mentioning in this operation. The dispensary patients generally come back to the dispensary the next day with only moderate, if any, edema of the eyelid or of the skin of the nose. The attendant pains are rarely considerable. As you see, the introduction of a very thick canula without the use of any kind of a speculum can be accomplished easily on all patients. Most of the patients can apply the canula themselves, if

necessary. The mucous membrane is destroyed only to a moderate degree, and besides, since very smooth walls are left by this operation, the granulation and epidermization can be obtained without great difficulty. To keep the opening continuously patent, I pack at first with isoform gauze, and use alcohol, protargol or nitrate of silver solutions to retard granulation and promote the formation of epithelium. Later I let the patient introduce a thick canula formed like an antrum canula, several times a day. Since such wide openings can be made, I have not found it necessary, so far, to establish continuous drainage; and have refrained from doing so also because of the irritation to the mucous membrane. But this can easily be done, if desirable.



This operation also involves the foremost ethmoid cells, which for the greatest part are being removed as well. If the duct from which the pus flows does not lead, as was supposed, into the frontal sinus, but into a large anterior ethmoid cell, it is no calamity if this empyema of the anterior ethmoid cell is opened up during the operation; and from this point the probably diseased frontal cavity can then be reached. It is to be noted as the most important factor that with this method the operator must always work *in front of* the tabula interna, which is covered by the protector, and not advance too far to the side. If the operator advances always closely alongside of the protector and in the direction of its position, then it is quite possible, in rare cases, that he may reach an anterior ethmoid cell instead of the frontal sinus; danger to the

tabula interna, however, is excluded. But if the probe, and then the protector, advances upward and forward $2\frac{1}{2}$ to 3 cm. or more from the infundibulum, they must have come to the frontal sinus or to a large anterior ethmoid cell.²

Of great importance in judging the proposed method of operation is the difficulty of making the diagnosis. I admit that it is often extraordinarily hard to decide whether it is a case of empyema of the frontal sinus or of the foremost ethmoid cells. But this difficulty is of like significance in external operations, and we must concede that such operations are often undertaken without sufficient reason for this course being found afterwards in the pathologico-anatomical conditions of the frontal sinus. Therefore, I see here no difference between external and internal intervention, except that in the latter procedure the external cicatrix is prevented. However, by carefully observing the origin of the pus and examining the patient at different times, the empyema can be located with a fair amount of certainty, and mistaken diagnosis avoided as much as possible.

The indication for internal operations upon the accessory nasal cavities is given in all cases of chronic empyema. The size of the opening, the more or less radical procedure is determined by the difficulty of the case, and the pathologico-anatomical changes; and the question is simply: when to abandon the internal method and to choose an external operation.

When, in empyema of the superior maxillary sinus, the cause in the shape of a diseased tooth is removed, treatment from the alveolus can be undertaken which, in a purely dental empyema, may lead to the desired results. However, in case of prolonged suppuration I would always advise opening the cavity from the lower nasal meatus and closing the alveolar opening.

If suppuration of the antrum in connection with nasal empyema continue a long time, notwithstanding the opening from the lower nasal meatus and the removal of all impediments to respiration; or, if, after several weeks' treatment, the suppuration does not abate to any extent, the indication is, sooner or later, that Küster's operation should be performed, the cavity examined for tumors, sequestra, etc., and any considerable pathological changes removed. After that, however, it seems to me better to close up the cavity again, and to conduct further treatment from the nose, unless the conditions are such that it is desirable to remove the entire mucous

² Care must be taken not to press the drills backward too forcibly against the protector, which, being made of copper, might be pierced, with danger to the tabula interna.

membrane and to let the cavity heal by granulation, or, as Lücke proposes, to widen the opening into the lower nasal meatus, and, after the opening from the fossa canina is closed, to remove the tampon from there.

External operation in empyema of the ethmoid and frontal cavities is, of course, strongly indicated when life is endangered, when there is a rupture into the orbit or to the exterior, and in case of threatening cerebral complications. But here, also, the indication is to be accepted with some caution. Numerous authors report complete recovery by the use of internal therapy without the proposed ample enlargement of the sinus ducts, even when pronounced edema of the eyelids and of the skin covering the nose and forehead has existed, accompanied by most excessive headache and apparently most threatening cerebral symptoms. At any rate, the internal operation may be attempted in such cases unless it is feared that the tabula interna of the frontal bone, or those portions of the pars orbitaria which form the base of the skull, are already perforated or extremely thin. If, later on, the external operation becomes necessary, nothing has been lost. On the contrary, the broad exposure of the ethmoid cells from within, the convenient drainage established by opening the frontal sinus into the nose, the consequent shrinking of the mucous membranes and the reduction of the inflammation will have created much more favorable conditions for the operation. I believe, therefore, that I am right in advising first the internal operation in nearly all cases, and in recommending the external operation only when such a course is strongly indicated, which every operator will decide for himself. For my part, I have always taken the course of advocating a radical method only when I was sure that I would have submitted to a radical operation myself under the same circumstances. With regard to the frontal sinus, a clear indication is given if in severe illness the ductus naso-frontalis cannot be probed with certainty.

Now, it may happen that a very large ethmoid cell is situated in front of the sinus frontalis proper, which may be very narrow, and forced to the front and upward, so that the supposed frontal sinus operation does not at first reach the frontal cavity at all. But, in the first place, such cases are very rare; and in the second place, it is hardly to be assumed that the frontal sinus should be diseased, and the large ethmoid cell below, which is so much more open to infection, should have remained sound. Besides, the same difficulty is encountered in the external operation.

Septa in the frontal sinus, the sphenoid cavity, or the antrum, need be taken into consideration only when other indications for radical intervention are present as well. If we recognize the effect of the air in respiration as an important therapeutic factor, then, I believe, it also affects cavities that are divided by septa (compare the middle ear); and in the case of the antrum of Highmore even a cavity which may possibly be double is generally opened up sufficiently through the large established aperture to make a favorable result possible.

The internal operations in empyema of the upper maxillary, the sphenoid, and the ethmoid cavities that I have been observing for years, have met with success throughout. The percentage of cures is extraordinarily high. Almost all cases improve so much that they are without any considerable distress, and generally do not want to subject themselves to radical measures. Even though in a number of cases an insignificant amount of discharge remains, it does not involve any danger worth considering because of the broad convenient passage established for the discharge. Besides, we know how comparatively rare are deaths on account of neglected empyema. On the other hand, there is very often a more or less copious discharge after external operations.

That in a great many cases the internal operation must have very considerable advantages over the external intervention is proved also by a large number of patients that apply for treatment with openings made from the canine fossa and the alveolus, who were not cured in spite of treatment extending over several years, in some cases ten or fifteen. In all these cases, I have closed the opening from the alveolus or the canine fossa after regulating the nasal respiration by more or less radical operations, and established an opening from the nose; and in by far the larger number of these cases I have succeeded in effecting a complete cure in the course of a few weeks or months, or at least in delivering the patient from the everlasting irrigations and the dependency upon the physician. It would be difficult to understand why many of these eminently chronic cases should be completely cured, unless, indeed, there had before been very considerable influences unfavorable to recovery in the shape of the presumably harmful factors above delineated, which are eliminated by the internal operation and replaced by favorable ones.

The further prospects for the internal treatment of the frontal sinus cannot, of course, be determined from the twelve cases³ that

³ In the meantime I have operated upon two more cases with greatest success.

have been operated upon so far, especially as I have employed this method only about six months. But all of these cases have remained free from any discomfort. In one instance, where considerable headache is yet in evidence, it is to be accounted for by a well-developed anemia and myalgia in the absence of any notable discharge from the frontal sinuses, which have both been opened. Most of the patients show a very moderate discharge, and in three cases the suppuration has stopped entirely. In all these twelve cases severe combined empyema had existed for many years.

Very interesting and to some extent convincing is the history of an especially bad case which I will take the liberty of relating briefly:

Patient R., 62 years, of Brandenburg, came under my care through the kind efforts of Dr. Dörfer on the 4th of February, 1906. In the course of eight years, he had been operated upon internally and externally, and suffered from empyema of all the accessory sinuses. Only the ears were sound. Above the right eye there was a cicatrix from the external operation upon the ethmoid cells. In the alveolus on both sides were rubber obturators of the size of the little finger, and after their removal a thick stream of creamy, very offensive pus flowed from the cavities. All the teeth of the upper jaw had been extracted. During the rhinoscopy a terrible fetor was conspicuous, which, as the attending physician affirmed, could not be obliterated by any deodorant. A great many polypi, enormous granulations, an abundance of fetid pus, all this, in connection with the man's far advanced decrepitude, at first made me think of a malignant tumor. The maxillary sinus could be fairly well surveyed from the alveolar opening. There were no marked changes in the mucous membranes. Pieces of the ethmoid cells which I extracted proved to be non-malignant. I now operated systematically: corrected the existing considerable deviation of the septum, curetted the ethmoid cells within reach, chiseled away the entire front wall of the sphenoid cavity, and opened the right upper maxillary sinus from the lower nasal meatus with the result that the discharge from the corresponding alveolar opening became at once extraordinarily small, which was especially interesting in comparison with the continuous plentiful suppuration on the left side. Thereupon I operated on this side and *with the same success!* Without touching the seemingly but slightly changed mucous membranes of the antrum, I allowed the alveolar opening to close, and lastly I operated upon

the frontal sinuses on both sides from the anterior, and was enabled to establish canals of such breadth that the patient can insert a canula of 5 mm. thickness without difficulty and thus treat himself.

The result is a relatively splendid success. To be sure, there is still a small amount of discharge from every ostium, but the fetid, excessive formation of pus has stopped entirely, and I see the patient, who enjoys the best of health, only about every four weeks, when, perhaps, I may have to remove an insignificant granulation. The patient, who for eight years had been in extraordinarily sad circumstances, is now, after the short interval of four months, though not entirely cured, yet without distress, able to work, and saved from the most serious mental depression.

This one history is representative of many others resembling it, though not always dealing with equally severe cases. Nothing more, however, could be proved if I were to relate them all in detail.

If we compare with this the success of external operations, we must admit that it is hardly more striking. I have seen numerous patients suffering from empyema that had been treated for years from the canine fossa with the broadest kind of opening, who absolutely could not be cured. I have seen external operations upon the frontal sinus and the ethmoid cells performed by the most skilled experts, cases that had been operated upon two, three, even four times, where a copious discharge remained that, in some instances, could be reduced or removed only by internal intervention after the closing up of the internal wound. These facts are easily understood if we consider the course of external operations, say, for example, upon the frontal sinus. Large and extensive openings may be made; the entire frontal sinus surveyed; diseased mucous membranes, septa, etc., removed; drainage through the nose established;—but then the operator is forced to close up the cavity again completely after two or three days, if only for cosmetic considerations. Whatever now happens inside the cavity, whether, perhaps, the contents of the orbits escape into the cavity, whether pus is secreted from new granulations or polypi that form in connection with unremoved fragments of mucous membrane, whether folds develop in which pus is deposited—all these possibilities are hidden from observation. Only from a broad nasal opening can the cure be influenced to any extent; and it is my belief that patients are much better off who have a broad nasal opening already established before so comprehensive

an intervention. If, on the other hand, the entire anterior wall is removed, and the cavity allowed to close by granulation, the consequences, especially in the case of large cavities, are severe cosmetic disturbances that cannot be sufficiently overcome even with paraffin injections.

To summarize briefly:

1. In every case of accessory sinus empyema, physiological breathing is first of all to be established.
2. In every case it should be attempted to bring about a cure by establishing a blood drainage opening into the nose.
3. In a large number of cases, perhaps in most cases, the frontal sinus also can be opened from within easily and without danger if the proposed method be followed.
4. The external operation is to be resorted to when the discharge is continuously profuse or of long duration; also when life is endangered. The after-treatment in such cases is to be conducted from within, unless the complete obliteration of the cavity by means of granulation is to be effected.

Wilhelmstr., 146.

PHARYNGO-MYCOSIS OR PHARYNGO-KERATOSIS.*

BY FRANCIS J. QUINLAN, M.D., NEW YORK.

HISTORY: Although the symptoms of mycosis or keratosis of the pharynx are both prominent and characteristic, information concerning this affection constitutes a relatively recent addition to medical knowledge. The literature of the disease begins with Fraenkel, a Berlin laryngologist, who in 1873 published an article on an affection designated by him as *Mycosis tonsillaris benigna*.¹ Seven years later, a similar case coming under the author's observation, the condition received further study, and came to be attributed to the activity of a micro-organism, the *Leptothrix buccalis*. Meanwhile, the disease had been observed by Baginsky, in a case of *ozæna* of the trachea,² and by Klebs,³ who ascribed it to the *Leptothrix buccalis*. These views were confirmed by the histological and bacteriological research work of Heryng.⁴ This investigator was the first to specify *Mycosis benigna* as *Mycosis leptothricia*, for he attributed the disease to the growth of the *Leptothrix buccalis*, notwithstanding his negative experiments with the inoculation of the fungus upon the conjunctiva of rabbits.

Fraenkel's second case, presented before the *Gesellschaft der Charité Aerzte* in Berlin in 1880, was promptly followed by an observation of the French author, Bayer, who reported two cases in 1882.⁵ Other early cases were reported by E. Fraenkel,⁶ Stoerk⁷ and J. Gumbinner⁸ of Berlin.

France again contributed to the literature the findings of Guinier⁹ and Ferre,¹⁰ who accepted the leptothrix theory. About this time, Chiari ascribed the condition to an excessive proliferation of the leptothrix, a normal inhabitant of the buccal cavity.¹¹ Under the title, *Algois faucium*, a monograph dealing with the subject was published by Jacobson,¹² which is considered by Siebenmann as having supplied the reverse of elucidation of the pathological picture under consideration. The disease has been described under the name *Seborrhœa tonsillaris* by Stoerk, 1895, and of *Angina leptothricia* by Schmidt, 1897. B. Fraenkel considers the best name for it to be indifferent *Mycosis benigna*.¹³

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While the stream of contributions to the subject kept constantly increasing after this date, for a number of years little or no doubt was expressed as to the correctness of the assumption of a parasitical etiology. In 1895, however, Siebenmann proposed the chemical theory, and suggested a change of the term *Mycosis leptothrix* to another more expressive of the actually existing conditions: "Hyperkeratosis lacunaris."¹⁴ Although far from universally accepted at first, this theory, which relegates the leptothrix to the background, has been steadily gaining new adherents, until at the present time, the foundations of the parasitical theory appear to be giving way before the weight of new evidence. Richardson,¹⁵ Lincoln,¹⁶ Hemenway and Brown-Kelly were among the first to share the views of Siebenmann. Kyle differs from Siebenmann by the establishment of two distinct varieties of the affection, in one of which the leptothrix is entirely absent.¹⁷ A process of keratosis instead of mycosis, was assumed to be the fundamental cause of the disease by Brown-Kelly, on the basis of ten personal observations.¹⁸

The parasitical origin of pharyngeal hyperkeratosis is not doubted by Andre Castex,¹⁹ nor by Moure.²⁰ Sendziak, in his illustrated prize essay entitled, "The Etiology and Treatment of Mycosis Occurring in the Upper Respiratory Tract,"²¹ expressed the opinion that the condition constitutes a typical mycosis, caused by the leptothrix buccalis.

On the other hand, Siebenmann's interpretation of the condition was accepted and endorsed by Onodi and Entz,²² who merely suggest a slight modification of the term *Hyperkeratosis pharyngea* proposed by Siebenmann. They reserve this designation for those cases only in which actual horny spikes have developed, whereas the milder forms, in which the change consists of thickening of the epithelium, are simply labeled as pharyngeal keratosis.

In his recent contribution to the subject, entitled: "Pharyngeal Hyperkeratosis,"²³ Florea Simonescu renders the statement that hyperkeratosis is not a microbic parasitical disease, and that for the explanation of its pathogenesis, a new or clinical theory is required besides the parasitical anatomico-pathological theory. In addition to his personal observation of a case, he submits a collection of thirty-one cases from the literature, reaching the following conclusions. Pharyngeal hyperkeratosis is more frequent in women than in

men (25:7). Hyperkeratosis is not a parasitical disease, and the leptothrix found in this condition is only a secondary complication devoid of importance for the evolution of the disease. In virtue of its primary lesions as studied under the microscope, this form of hyperkeratosis belongs to the general class of the cutaneous hyperkeratoses.

ETIOLOGY.—It results from the literature that the *Leptothrix buccalis* is most commonly conceded to be the causative factor of the disease. The term really includes four chief constituents of the buccal flora, namely, the *Bacillus maximus buccalis*, *Spirillum sputigenum*, *Spirochaete dentium*, and the *Leptothrix innominata*.²⁴ A run-down condition of the system has been supposed to predispose to an exaltation of the mycotic growth (Semon), and again, the sequelae of chronic inflammatory conditions have been regarded as an essential requirement. The affection has been observed to arise in connection with an exclusive milk diet, or with promiscuous handling and fondling of animals. Malaria has been assumed as the predisposing factor in benign pharyngo-mycosis, the pathogenic bacteria being supposed to resemble a fungoid growth of stagnating waters (Hem-enway).

A radically different etiology is propounded by Siebenmann, according to whom the pathological process is essentially a cornification of the lacunar epithelium. The evolution of the leptothrix fungus here is presumably referable to the altered nutritional conditions of the soil. A similar and even more practical importance is possessed by this keratosis of the lacunar epithelium as constituting an easy avenue of entrance for pathogenetic microorganisms, notably the tubercle bacillus and the pus cocci.

While admitting the parasitical character of the disease, a number of authors (Lober, Oltuszewsky, Vanderpool, Schiffers, Goris, Spaans, Putermann, Newcomb, Jurasz, Lennox-Brown) insist upon the simultaneous existence of other local or general conditions favorable to the growth of the fungus.

One of the most recent writers on the subject (Simonescu) says that, in a general way, all cutaneous or mucous keratoid productions owe their origin to an abnormal diathesis as well as to nutritional or vasomotor disturbances of the skin or mucous membranes. This predisposition to hyperkeratosis is not permanent. Originally produced by certain pathological conditions of the organism, it disappears with the re-establishment of the general health. During, or sometimes after, this disturbance, the mucosa of the throat furnishes only an insufficient quantity of a thickened secretion, whose chem-

ical composition has ceased to be normal. Circulation and innervation being interfered with, the deep epithelial layers, instead of being regularly renewed, tend to produce fine scales which are devoid of nuclei; analogous to the process of cutaneous hyperkeratosis. As a result of these nutritional changes, the modification of the lining epithelium of the throat (tonsils, pillars, pharynx, etc.) is followed by horny changes. As they increase in size, these productions finally pass beyond the orifice of the tonsillar crypts and of the follicles of the pharyngeal mucosa. This constitutes the evolution and establishment of hyperkeratosis. After it has once made its appearance externally, the leptothrix and the other microorganisms of the mouth are superadded.

The fungus is relegated to an entirely secondary position by Kraus,²⁵ who considers the disease as a hyperkeratosis pure and simple, grouping it together with *Pachydermia laryngis*, *Leukoplakia* and *Nigrities* of the tongue. Arnsperger²⁶ assumes an inflammatory basis for the disease, the fungus playing merely the part of a parasite. He divides the affection into two distinct pathological processes, namely, mycosis and hyperkeratosis. Simonescu believes that the most plausible explanation of pharyngeal hyperkeratosis rests upon a temporary lowering of the general health, either under the influence of neurasthenia and general weakness, or under that of dyspepsia or chlorosis and anaemia, especially in women (loc. cit.).

LOCALIZATION.—The upper respiratory tract is susceptible, and may be affected, in part or in its entirety, including the nasopharyngeal cavity, Luschka's tonsil, the pharyngeal orifice of the Eustachian tube, Rosenmüller's fossa, the laryngeal surface of the epiglottis, the ary-epiglottic ligament, the sinus pyriformis, the vocal chords and the larynx below these structures. More commonly than in any other region, the fungus flourishes in the faucial tonsil. Mycosis leptothricia here may be unilateral or bilateral, and frequently involves at the same time the lingual tonsil, which region is assumed as the most common location of the trouble by Fraenkel and Kraus.²⁷ The seat of the lesion was practically limited by Siebenman, and after him by Hemenway, to the faucial tonsils and their crypts.²⁸ These views are not supported by the recent writings of authorities, such as Sendziak and Simonescu. The last named observer states that the term Pharyngeal hyperkeratosis is more appropriate, because more accurate, than any other designation, including Siebenmann's Lacunar hyperkeratosis, and Brown-Kelly's

Pharyngeal keratosis. According to him, the minute whitish manifestations of the fungus growth may be distributed to all the various regions of the throat; and this disease claims a distinct and plainly outlined position in the pathology of the pharynx.

PATHOLOGICAL ANATOMY.—In the microscopical examination of affected tonsils, Siebenmann demonstrated the presence of structures which have been visible microscopically as projecting spikes. These he showed to consist of sacs of cysts, with relatively thick walls, and made up either of stratified layers of nonnucleated corneous epithelium, partly of a homogenous, horny substance, resembling that of a human hair. The central lumen of the spike was very fine and usually clogged with detritus, bacteria and mucus, although sometimes filled with adenoid tissue which evidently was connected with the remaining tonsillar substance by an orifice at the bottom of the cyst wall. Where the spikes projected beyond the crypts of the tonsils, they were locally studded with bundles of leptothrix fibres. All the signs of inflammation, such as hypertrophy of the connective tissue and marked roundcell infiltration, were conspicuously absent in the surroundings of the crypts. The process evidently constituted a remarkably intense cornification of the lacunar epithelium. Heryng stated in 1884 that the small projections were formed by an accumulation of cornified epithelial cells, surrounded by a finely granular yellow mass, strongly refractive under the microscope, with a surface covered by leptothrix filaments. Ferre²⁰ claimed that the whitish deposit of mycosis consisted in round cells, which had undergone more or less fatty degeneration, and in microorganisms appearing under various forms, all representing filaments of the *Leptothrix buccalis*. The character of the pathological concretion as always containing a nucleus composed of cornified epithelial cells, closely adherent to each other, with the leptothrix filaments simply arranged around the nucleus, was likewise recognized by Hemenway (loc. cit.), and by Knight.³⁰ These findings were corroborated by de Nabias and Sabrazes, who published the results of their investigations under the title, "*Corps Etrangers et Productions Cornées de l'Arrière Gorge dans la Pharyngo-Mycose.*"³¹ The small projections were interpreted by Brown-Kelly, in 1896, on the basis of ten personal observations, as an accumulation of cornified epidermal lamellae; the condition accordingly constituting a true keratosis.

According to the definition of the disease given by Andre Castex (loc. cit.) pharyngomycosis is an affection characterized by para-

sitical products which stud the walls of the pharynx chiefly in the crypts of the palate and lingual tonsils. Imbedded in a crypt or a glandular cavity, the mycotic growth rests upon a base where the lymphoid or glandular tissue has become replaced by a sclerotic layer, the vessels of which are atrophied. An accumulation of horny epithelial cells projects above this sclerotic layer and is interspersed with the leptothrix spores and filaments. In the opinion of Garel, these histological features seem to point to the alteration of the crypts as the primary factor, with the mycosis as the sequel. According to the histological investigations of Onodi and Entz (loc. cit.) the character of the disease, at the base of the tongue as well as at the tonsils, constitutes a horny change of the epithelium, namely, a tissue metaplasia, accompanied by a moderate inflammation of connective tissue. The disease develops on a basis of chronic inflammation, as evidenced by the histological specimens. Several investigators mention the fact that the disease appeared in individuals who had repeatedly suffered from inflammatory conditions of the throat. In all probability, the weak but long continued irritation produced by the repeated inflammation is the cause of the rapid increase of the epithelial cells. The finding of leptothrix threads at and within the epithelial layers is purely accidental. The fungus stands in no sort of etiological connection with the disease.

BACTERIOLOGY.—The *Leptothrix buccalis*, claimed as the cause of the condition under consideration by a number of authorities, including Sendziak and Andre Castex, has never been obtained in pure culture. According to the former observer, it is claimed by Jacobson, that the culture was apparently obtained in 75 per cent of his cases, from the tufts within the tonsillar crypts.³² The fungus is classified under the species of hypomycetia, and in the family of trichomycetia, by Petruschky.³³ The familiar microscopical picture of leptothrix, as represented by its most important variety, the *Bacillus maximus buccalis*, consists in bundles made up of a number of parallel threads, while another form, the *Iodicoccus vaginatus*, presents in shape of small cellular chains.

The leptothrix is supposed to encounter conditions peculiarly favorable to its existence and multiplication between the filaments of the pathological products, which explains its almost invariable presence, but to play a very secondary part in the actual production of the disease, by Garel, on a basis of twenty-nine personal observations. The organism has been demonstrated in several other conditions, including tonsillar concretions, tonsillar mycosis, and

also adenoid vegetations of the nasopharynx.³⁴ The effect of *Leptothrix* upon buccal fermentation, the production of acid saliva and dental caries, also of a tendency to gastric dyspepsia, may be said to constitute the first link in a vicious chain, all the above enumerated conditions predisposing to a lowering of the standard of general health, and with it to the settlement of this malevolent horde of parasitic invaders. Petruschky (loc. cit.) does not consider the fungus as pathogenetic in character. The seat of predilection of the parasite is on the palatine tonsils, also on the lingual and Luschka's tonsil. The growth was found by Castex on an arytenoid fold. Other parasites than the *leptothrix* found in these mycotic formations are the *Bacillus fasciculatus* (Shadebeck, 1882), the *Oidium albicans*, *Nigrities linguae*, *Mycosis sarcinae*, *Aspergillus fumigatus*, *Actinomycetes*. Mycotic growths in general are favored by local pathological conditions of the larynx. An acid condition of the saliva is considered essential to the growth of *leptothrix* by Charles Robin, and corroborated by other observers.

SYMPTOMS.—The patient, in the majority of cases, a young or middle aged female, as a rule, makes the discovery of a whitish growth studding the throat by a mere accident, although these findings may be preceded by a sensation of roughness and scratching in the parts. On closer inspection, a number of whitish plugs, more or less solid, are seen projecting above the surface, usually affecting the Faucial tonsil and the base of the tongue, where the projections may attain the size and shape of long spikes or thorns. Inflammatory phenomena are usually absent. The act of swallowing becomes painful in the more severe forms of the affection only, which may likewise be accompanied by rise of temperature and swelling of the cervical lymph glands. The formations are characterized by their solid attachment as well as by their hard consistency, both properties serving to distinguish them from other tonsillar concretions (Siebenmann). Whereas measures designed for their removal are usually inefficient, these formations have a marked tendency to subside spontaneously within a few weeks or months. The condition may be associated with, or give rise to, certain nervous hypochondriac states, referable to the morbid fears of the patient. The most prominent among these nervous complications in paraesthesia pharyngis. The affection as a rule pursues an insidious course, extending over a variable period, from a few weeks to several years. The growth may present a sudden ex-

uberance, or on the other hand the proliferations may subside spontaneously. The character of the condition is distinctly obstinate, not to say rebellious to all forms of treatment. In contradistinction to the unanimous view of writers on the subject, Simonescu says that the nature of the disease is not chronic, but that it is characterized by a temporary progression.

DIAGNOSIS.—Opinions are divided as to the simplicity of the diagnosis without the assistance of the microscope. The experience of the examiner probably plays a more important part in this connection than the distinctness of the traces left by the fungus in the throat of the patient. Cheesy tufts, such as those appearing in caseous tonsillitis, while presenting a somewhat similar appearance, may be differentiated by their ready surgical detachment no less than by the strict limitation to the crypts of the tonsils. Mycosis leptothricia is not limited to any one portion of the upper air passages; the only part in which it has not been observed being the nasal cavities. Sendziak believes that a certain number of cases of caseous tonsillitis, if examined minutely under the microscope, will turn out to be real cases of Mycosis leptothricia. (Étiology and treatment of mycosis, loc. cit.) The local manifestations of Angina tonsillaris follicularis, although usually accompanied by a high fever and swollen lymphatic glands, may present a close resemblance to Mycosis leptothricia. Neither does Diphtheria invariably bear the hallmark of the diphtheritic membrane, and the presence of this disease instead of that of the more harmless disorder can sometimes be determined only by means of the microscope. In lacunary tonsillitis, the tonsils are swollen and painful, and the yellow points do not project like the mycotic plugs. Calcareous concretions of the tonsil are not numerous and may be readily removed. Thrush is differentiated by its occurrence in infants, at the margins and rim of the tongue, under conditions of general cachexia. Herpetic angina is generally situated at the velum of the palate, and associated with vesicles having a characteristic red areolar zone. In miliary tuberculosis, the lesion is not in the tonsils, and the general condition of the patient is suggestive of the pathologic deposit.

While the prognosis of any given attack of Pharyngomycosis or Pharyngokeratosis is not unfavorable, recovery having been observed to take place in the absence of any remedial measures whatsoever, the patient remains susceptible to this and kindred pathological processes not only, but there is a marked tendency to recurrence.

TREATMENT.—In those cases where the discovery of the condition is the result of an accident, all treatment is considered as superfluous by Onodi and Entz (*loc. cit.*). In the presence of disturbing symptoms, however, local treatment is positively indicated. Rinsing or painting with bactericidal solutions is entirely unnecessary in *their* opinion, the character of the disease consisting in the cornification of the lacunar epithelium rather than in the proliferation of the fungus. Treatment may consist in the mechanical removal of the plugs, namely, excochleation with a sharp curette, extirpation with sharp forceps, or in the ablation of large portions of the tonsils by means of the tonsillotome, with the knife of the galvano-caustic loop. This radical interference is followed either by cauterization with trichloroacetic acid, or with the galvano-cautery to prevent reaction. The total removal of the spikes and plugs not only contributes to the peace of mind of the patient, but it usually does away entirely with a repetition of the trouble.³⁵

Castex recommends spraying with menthol or carbolic acid, both morning and evening. The tonsils may be touched with a solution of zinc chloride or iron perchloride. The procedure of election consists in the extirpation of the mycotic plugs with fine tweezers; to be followed by galvano-cauterization of the evacuated crypts. Should the affection prove rebellious, it is advisable to remove all parts of the tonsillar mass. Although convinced of the parasitical origin of the trouble, Castex insists on the necessity of attention to the general health, notably, the management of an existing dyspepsia, or other disturbing conditions. The same importance was attached to the correction of gastrointestinal irregularities by Richardson.³⁶ This author does not consider local treatment as required in cases without subjective symptoms, in which opinion he does not stand alone.³⁷ Radical local treatment is, however, advocated by the majority of observers, in order to counteract the marked tendency to recurrence. The galvano-cautery has its adherents, Castex, Root, Sendziak, as well as its opponents, Semon, Otuszewsky, Spicer. Jacobson does not consider the galvano-cautery or the performance of tonsillotomy as indicated, and he prefers the mechanical removal of the plugs, to be followed by rinsing with mercuric bichloride (1:2,000.). Scraping of the tufts with a sharp spoon curette, puncturing of the crypts with a sharp cautery, all have their advocates, Sendziak, Heryng, Hemenway (*loc. cit.*), Cheatham,³⁸ Thomas.⁴⁰ Sheck advocates mechanical measures, such as excochleation, tonsillotomy, and the use of the

galvano-cautery; whereas, Stoerk obtained the most satisfactory results from the local application of a 2 per cent solution of creosote.

A considerable number of remedies has been employed more or less successfully, such as bichloride gargles of variable dilution (1:1,000 up to 2 per cent), zinc chloride, silver nitrate, salicylic acid, absolute alcohol, pyoktanine, formalin, tincture of iodine, chromic acid, trichloroacetic acid, etc. Nicotine was administered by Jurasz in a proportion of 2:100.⁴¹ The alkaloid proved useful in a case of Sendziak's, as did also tobacco smoking, and observation confirmed by Donellon,⁴² and Heryng (loc. cit.). Tobacco is mentioned as a remedy of possible value in this connection by Castex (loc. cit.). He and Sendziak are agreed upon the desirability of removing hypertrophic tonsils, when the structures are markedly enlarged and the disease proves rebellious to treatment. The galvano-cautery snare is especially recommended for the purpose in order to prevent the occurrence of secondary hemorrhage, which view is not sustained by the writer.

A case of hyperkeratosis of the pharynx, in which the leptothrix buccalis was not demonstrated microscopically, in a young girl 15½ years of age, was successfully treated in the following manner by Simonescu: After the buccal cavity had been rendered antiseptic by gargling with a solution of salicylic acid (2 per cent), the pathological products were ablated in two sessions, with an interval of ten days, by means of a small, sharp curette. Each spot from which a tuft had been removed was touched with a solution of chloride of zinc (1/50). That many of the remedies proposed are worse than the disease itself, is conceded by certain observers, such as Schmidt, Rosenberg, Fraenkel, and Chiari, who prefer tobacco smoke, or the local application of trichloroacetic acid, absolute alcohol, and chromic acid, respectively.

In conclusion it may be stated that a comparative review of the publications on the subject of this peculiar affection shows a pretty general tendency on the part of writers to accept the leptothrix theory. No *particular importance* is by them attached to the fact that this mycotic growth is normally present in the mucous lining of the tongue and on the surface of the teeth.⁴³ It is likewise disregarded by some writers that an ulcerated condition of the buccal mucosa, with lowered cellular vitality or local death of tissue, assists these parasitic proliferations. Notwithstanding its nonpathogenetic character, the parasite has claimed a considerable degree of

attention on the part of investigators, ever since it was first described by Robin in 1853.

On the basis of recent research work, the view is gaining ground that the settlement of the fungus at the diseased epithelial lining constitutes a secondary, rather than primary process. According to Onodi and Entz, the changes of the epithelium have, so to speak, prepared the soil for the microorganism, without standing with it in any kind of etiological connection. Richardson, while recommending the radical destruction of the matrix with the submucosa, in order to eradicate the trouble in rebellious cases, regards the leptothrix as a secondary intruder, not as the cause of the disease. Reasoning on a basis of analogy with parasitic stomatitis, it would seem as if the mycotic growth under present consideration were indirectly dependent upon an altered chemical reaction (hyperacidity?) of the secretions of the mouth, due in its turn to a local nutritional disturbance, perhaps ischaemia and defective innervation. A certain degree of inanition on the part of the individual appears to have been present in every reported case; and suboxidation, local or general, constitutes in all probability a *sine qua non* of the affection.

The true explanation for the process of pharyngomycosis, or hyperkeratosis, if this should prove to be the essential factor of the disease, is one of the contributions to medical knowledge we are perhaps justified in expecting from a not too distant future.

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33 West Thirty-eighth Street.

VOCAL NODULES.

BY H. HOLBROOK CURTIS, NEW YORK CITY.

IN THE LARYNGOSCOPE of November last appeared an article by Dr. Frank E. Miller, of New York (The Cause of Vocal Nodules), in which I have been misquoted as to the method advanced by me for the cure of singer's nodules. As my method has been in use for some fifteen years and has been accepted by the greatest singers of today as the most efficient means of relieving the condition known as singer's nodules, a condition so frequently encountered in operatic coloratura artists, it seems but just that I should be rightly quoted.

Alluding to the investigations made by Prof. Oertel, verified by Koschlakoff, Simanowski and myself, in regard to the manner of vibration of the vocal cords,¹ Dr. Miller, on page 850, makes use of this most remarkable and complex sentence: "Of course, we will have our own opinions, and, having made some investigation, we think that this is not proven beyond a doubt; and we do not believe that it can be so, for the one grand reason that it is impossible to make proper observation with an instrument which employs a human subject whose cords are to be seen, again the eye and hand of the operator, and still further an instrument whose revolutions are too rapid for the human eye to make correct observation; and then again in all of these observations we can see only the one side of the cord, that being the upper side."

It is clear to my mind that Dr. Miller has never seen a laryngostroboscope, and has never studied the principle of the siren; for only by means of this instrument can the cords be studied in vibration. This is accomplished by making the pitch of the siren the same as the note sung. The instrument is illustrated and fully explained in my book entitled "Voice Building." No argument, consequently, is possible on this subject. Again, on page 860, Dr. Miller says, in referring to the treatment of nodules: "Dr. H. Holbrook Curtis's demonstration consists in depressing the chin on the sternum, using supra-costal respiration; at the same time singing the syllable 'Maw' at middle 'C' falsetto, while plucking the lips with the finger and focusing the tone 'Dans le Masque.'

¹ *Arch. f. Laryngol.*, 1895 and "Voice Building and Tone Placing," D. Appleton & Co., N. Y., 1896.

"Dr. Curtis's idea might be explained on the ground that by singing falsetto the position of the arytenoids are so changed in their action on their cricoid facets that the edges of the vocal bands have a different alignment, hence vibration under such conditions might benefit and reduce the nodular condition of the cord, as it would no longer be irritated by the opposing cord. But the voice specialist should not use vocal exercises for inflammatory conditions nor allow singing at all for at least ten or fourteen days, dependent, of course, upon circumstances."

It seems to me that Dr. Miller is taking a very narrow view of the causation of singers' nodules, if he narrows it down to the presence of cheesy deposits in the tonsils, and he has wasted much valuable time in experimenting with his goats and dogs. Ingrowing nails may be quite as prolific a cause of nodules, or any other bodily ailment as well, provided it give sufficient discomfort to disturb the vocal poise.

I have seen a pair of well-developed nodules result from singing an opera after news of the death of a child was received immediately before a performance, and I have seen many nodules appear on the cords of the great artists, who have scarcely a vestige of tonsillar tissue between the pillars of the fauces.

Dr. Miller leads one to infer that my exercises are to be sung in the falsetto register. I have shown frequently with my own voice in the falsetto register how a soprano should do these exercises, but my specific rules are as follows:² "If a soprano, take middle C, or a note thereabouts, for example,

"1. Hum a tone with the mouth closed, preceded by a slight puff of air through the nose, as one would imitate the hum of a bee.

"2. After making this tone as pure and musical as possible (by musical is meant resonant or full of overtones), fix the mind upon the word *Marv* and mentally bring forward the tone, almost saying it, until we feel conscious of the vibration upon the lips; at the same time the position of the initial tone should not be changed. To ascertain if the mouth focus is correct, simply pluck the lower lip with the finger as you would pluck the string of a musical instrument, and if the mouth tone is sufficiently far forward an explosive sound like *Marv* will answer. If this tone is not of almost equal purity to the head tone, which all the time must be sounding, the equilibrium of tone, i. e., the division into

² "Voice Building and Tone Placing," p. 154.

the mouth and facial, is not satisfied, and we must experiment until we get the mouth tone as pure as the facial.

"3. Having gotten the purest tone possible, let us now direct the pupil to drop the lower jaw and open the mouth by simply allowing the weight of the jaw to accomplish this without the slightest muscular effort. Our mental *Ma* now breaks on the lips into tone, and we have the pure vowel with its prefixed consonant without being aware of the effort that has produced it—it comes so spontaneously and beautifully, and seems to originate on the lips. The mouth is now closed, and if we have not interfered with our focus of attack, we hear the initial *Hum* still vibrating pure and beautiful in the facial resonators.

"4. After this exercise with the correct focus of tone has become thoroughly familiar, the next step is to take a phrase and sing the notes with *Ma* or *Ma* instead of the words of the song, always commencing in that portion of the scale which will allow of the easiest initial tone for the focus.

"These are the exercises so much appreciated by singers that we employ for the reduction of nodules of attrition on the cords, which exercises, strange to say, have been the object of ridicule by certain laryngologists who have undoubtedly not given the subject of physics a proper amount of consideration. We are indebted to the stroboscope for the scientific vindication of our theory and treatment of singers' nodules. The word *Ma* should be sung in this manner for several minutes at a time and every hour in the day. It makes no difference on what note it is sung, provided the resonators add new overtones to the voice and thus produce a rearrangement of the vocal cords in their manner of vibration. These exercises must be accompanied by the high-chest method of breathing, as described in the chapter on respiration. As we have so often stated, an additional resonance and consequent augmentation of overtones is derived from this source, and constructively assists in the rearrangement of the manner of vibration of the cords, at the same time increasing their tension. After all, the correct focus of attack or the proper placing of tone is the most important thing to be studied in singing. Without it our voices do not possess charm and the vitality is jeopardized. By the steady employment of them for an hour the above exercises have pulled many a weary voice together, and enabled many a distracted artist to go with confidence upon the stage or platform. Their daily use gives new overtones to the voice, prevents

attritus and allied affections of the cords, and enables the singer to use his voice through many a cold with comparative immunity. In the treatment of relaxed cords and of congested cords, a good piece of advice to give a pupil is this: Until you can do a pure *Hum* with the mouth closed and without effort, do not attempt to talk, simply whisper and make the attack upon the lips even while doing this. By observing this rule many a prolonged hoarseness may be prevented. In either of the above conditions the *Maw* exercises may be commenced with benefit to the cords as soon as the head *Hum* is easily produced."

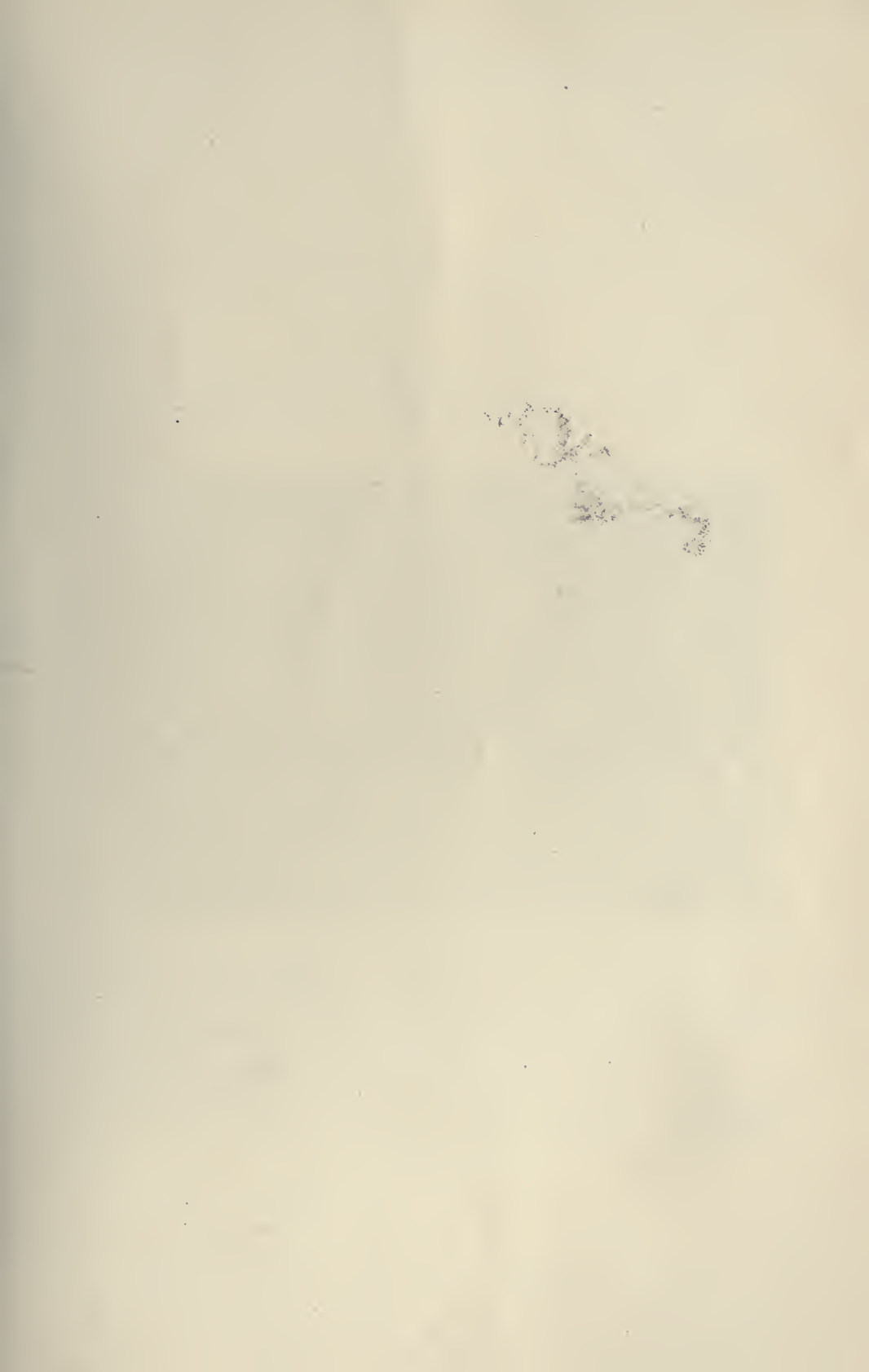
Dr. Miller sees fit to state that the vocal exercises advocated by me for a correct voice placement, and for the cure of singers' nodules, are "not a useful procedure" and are "apt to upset a voice mechanism acquired after years of study." He goes on to say: "By a remarkable combination of circumstances it has been my privilege to have under my professional care all four of the leading solo soprano voices of old Trinity, St. George's church, Heavenly Rest, and St. Thomas's." The doctor names them and goes on to state that the nodules found in their throats were all of tonsillar origin. That I do not gainsay, but, while I admit that nodules may be due to cheesy deposits, they are due also to many other causes. And while no such "remarkable combination of circumstances" may have occurred to me, I have made a most serious study of nodules and the theory of voice placement, and the system of cure I advocate has been endorsed by such singers as Jean de Reszky, Melba, Sembrich, Patti, Ternina, Caruso, Scotti, Fremstad, Plancon, Gadski and many others who have assisted me in the study of fundamental tone placing.

118 Madison Avenue.



Dr. A. Braun, Pinx.

TRAUMATIC LARYNGITIS WITH PROLAPSE OF VENTRICLE.





FIBROUS ATRESIA OF NARES.

A CASE OF FIBROUS ATRESIA OF NARES.*

BY JOSEPH H. ABRAHAM, M.D., NEW YORK.

G. H., aged 15; admitted to Professor Delavan's clinic October 23, 1906.

History. Two years ago, while playing baseball, a bat slipped from the hands of a fellow-player and struck him on the right side of his face and nose. His nose bled profusely, and the little patient was carried to a hospital. After remaining one week he returned to his home and since then gave little thought to his nose, excepting his inability to breath through the right nasal cavity.

Examination. Externally, there is a perceptible deflection of the nose to the left; also a slight depression on the right side of the nose at the junction of the lower border of the right nasal bone with the soft parts of the nose. Intranasal examination reveals a most peculiar pathologic condition on the right side, situated at the junction of the muco-cutaneous surface of the vestibule in its entire circumference. A fibrous circular web can be detected with an oval shaped opening in its centre 8 m. by 5m. in diameter. Through this narrow opening the patient attempts to breath, but finds it impossible, as you can see when I place my finger in front of his left nostril.

On October 30th, I injected a 1/2% solution of cocain with 1-5000 solution of adrenalin chloride into the web and removed it by a careful dissection. The free surface of the web was very thin. The attached surface varied in thickness from 2 to 5 m.m. A packing of iodoform gauze 5% covered with soft rubber tissue with numerous perforations for free drainage was inserted. Three days later I removed the packing and on October the 9th, discharged the patient cured without a sign of contraction and with normal breathing.

616 Madison Ave.

* Read before the New York Academy of Medicine, Section on Laryngology and Rhinology, October 24, 1906.

ON THE COMPLETE REMOVAL OF DISEASED TONSILS.

BY E. MORAWECK, M. D., AND G. C. HALL, M. D., LOUISVILLE, KY.

At a meeting of the New York Academy of Medicine, Section on Laryngology and Rhinology, May 23d, 1906, Dr. J. H. Abraham makes this statement as reported in *THE LARYNGOSCOPE*: "This was the first instance in which he had completely removed the tonsil." This statement provoked no discussion and went unchallenged so the society impliedly at least acquiesced in the belief that as a rule it is not necessary to remove the whole growth, or that it is not wise to do so or is inexpedient.

This statement is closely allied to the belief that if the tonsil is clipped or partially removed the rest of the organ will atrophy. Numbers of cases that we have seen of partial removal of the tonsils also strengthens us in the belief that quite a large percentage of men must follow this practice and we regard it as wholly erroneous and bad; for it subjects the patient to an operation without the certainty of relief and thus brings both operation and operator into disrepute, for a very little more care and time would result in the satisfactory removal of the whole gland. No surgeon would consider the partial removal of the appendix, the partial removal of any tumor if it is possible to remove it all or the partial removal of gall stones; therefore, why should this method be in vogue in the case of the tonsils? Some cases of this partial removal of which we speak are due to careless and incompetent operating but not all.

We do not know who is responsible for this theory but do know that it is not borne out in actual life. In the first place, tissues that show a tendency to hyperplasia show it in all parts, so that the stump of a tonsil that is partially removed hypertrophies instead of atrophies. Another thing, tonsils are very often submerged and more of the gland lies behind the pillars than projects from it; if therefore the gland is clipped even with the pillars you still have about two-thirds of your trouble remaining. You still have the crypts filled with infective material, catching pieces of food, still the chance of infection of the tonsil itself or the peritonsillar tissues. That the operation is inadequate and unsatisfactory can best be proved by the numbers of cases that come for secondary operation, for if once the gland were wholly removed it is inconceivable that it should grow again.

As instruments designed to thoroughly remove the tonsil, the various tonsillotomes on the market are wretchedly inefficient. The prongs of the instrument cannot be elevated high enough to raise the tonsil from its bed, so alone you can not hope to cut out more than half of the organ, and in case you use a separate forceps to pull out the gland, the prongs are simply in the way. The cutting edge, too, is very keen and thus predisposes to hemorrhage. Our preference is for the cold wire snare and the best is Kratzmueller's modification of Peter's snare.

The operation which we believe best fulfills the requirements in this condition is performed as follows: In the case of young children, we prefer a general anæsthetic, especially if, as is usually the case, there are adenoids to be removed also. The nose and throat are first cleansed and adrenalin is applied to both, as it materially assists the breathing which is always bad in these cases. Under full surgical anæsthesia, the tonsils are first separated from the pillars by blunt tonsil knives. With the forceps pulling the tonsil out from its bed it is then freed above and below with scissors curved on the flat. This is very important, as the junction of the pillars above is chiefly where a little portion of the glands remains after the operation. After this is done and the tonsils lie loosely in their beds attached only at the base, the forceps are inserted through the wire loop of the snare, made to grasp the tonsil in a firm bite including the extreme upper and lower portions; the wire loop is pressed firmly against the pillars and tightened while firm traction is made with the forceps; the whole gland is thus removed, which can be shown by the fact that the cut part of the tonsil is through fibrous and not lymphoid tissue.

As a rule there is very little bleeding following, which, however, is not the case where only a portion of the gland is removed. We have never yet had to deal with secondary hemorrhage when we removed all of the gland. After the slight bleeding from the first is controlled usually by persulphate of iron, the other one is similarly treated. The adenoids are removed last, care being taken to press the curette well up and back to get the upper part of the growth and to go over the sides, thoroughly cleaning out all the lymphoid tissues around the fossæ of Rosenmueller.

In older children that we can bring under control and in adults, we prefer cocaine as an anæsthetic. This we apply first to the tonsil and pillars in 12 per cent. solution on swabs and after about ten minutes inject ten to fifteen minims of a weak cocaine and supra-

renalin solution deep into the substance of the gland through the anterior pillars. We find that superficial injection is usually inefficient because the solution escapes through the crypts as fast as it is injected. In three to five minutes after this injection the patients usually complain of a slight oppression of respiration and experience rapidity of the heart's action which we believe due to the supra-renalin. Then is the time to operate, for if due to the anæsthetic the operation is the best antidote we possess.

As described above, the tonsil is quickly freed from the pillars, dissected out above and below pulled well out by the forceps while the wire loop of the snare is pressed firmly against the pillars. With one firm snap of the instrument the tonsil is completely removed.

A gargle of cold permanganate solution and applications of persulphate of iron stops all bleeding. Patients who are not readily accessible or who, living in the country, contemplate leaving for home the same day, are always given a hypodermatic injection of Ergot before leaving the office. We keep the patient quiet for twenty-four hours, give ten grain aspirin powders every three hours for any pain, which is usually referred to the ear, and allow a week to elapse before removing the other gland, though at times we have removed both at the same sitting.

The feature of the operation is the total removal of all diseased tissue—a true tonsillectomy. The points to be considered are: the thorough anæsthetization by local application and injection, which keeps your patient quiet and enables you to do the work thoroughly; the wide dissection of the tonsil as preliminary to the snare not only freeing it from the pillars but dissecting it free both above and below; a wide grasp with the forceps from above downward with firm traction, enabling the snare wire, with pressure against the pillars, to cut off the gland at the very base.

The operation as described is entirely satisfactory and we have not had a single bad result. All are relieved of their trouble and no secondary operations are necessary. We have never seen a case of severe hemorrhage following the operation. The method is similar to that of Pyncheon's cautery dissection, but we prefer our instruments to the cautery as we believe we can keep them better under control.

We have not discussed the indications for the removal of the tonsils, as except in acute inflammatory conditions, we believe that the presence of a hypertrophied tonsil is sufficient indication for its removal.

Gaulbert Bldg.

THE REVERSE ANTRUM BONE FORCEPS IN ANTRUM SURGERY.

BY LOUIS OSTROM, M. D., ROCK ISLAND, ILL.

Surgery of the Antrum of Highmore can be divided into two classes, radical and conservative. Of radical operations, we have a range of choice from the most radical of all, Denker's, to others



Fig. 1. Method showing the Enlarging of the Ostium Maxillare.

more or less complicated, which should be reserved for the desperate cases, where the disease has caused extensive necrosis or other tissue destruction. It must be said that many radical operations are performed where much simpler methods would be by far more preferable for the patient, with just as good results and far less suffering, provided the operation is carefully made.

Conservative surgery is only a relative term, but ordinarily means simple drainage through the alveolus, canine fossa, middle or inferior meatus, with slight modifications. Midway between

these extremes lies a wide medium, which varies almost from radical to conservative. If the operation can be performed under local anesthesia, with no pain, and little or no delay or detention from ordinary business, the operation may be radical to the surgeon, but easy or conservative to the patient, and conversely, if the patient is subjected to inefficient local or general anesthesia, he certainly will consider the most conservative operation quite radical.

I have performed every known Antrum operation, and in selected cases the results have been perfect. The more I do of

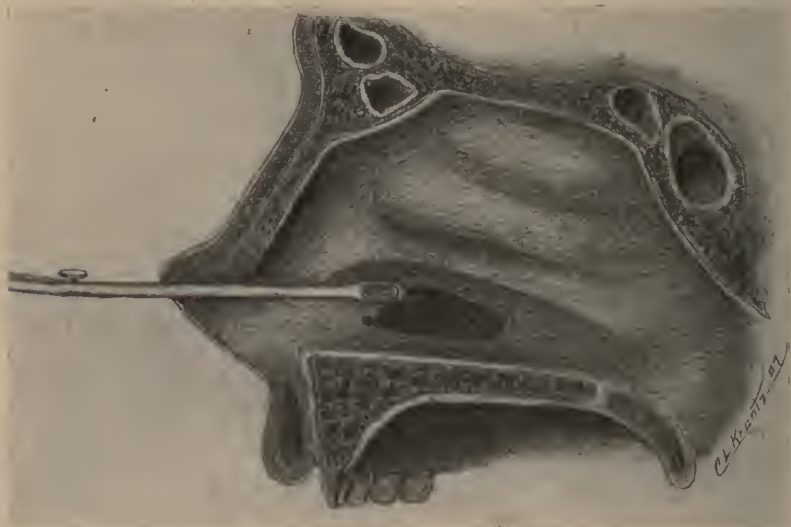
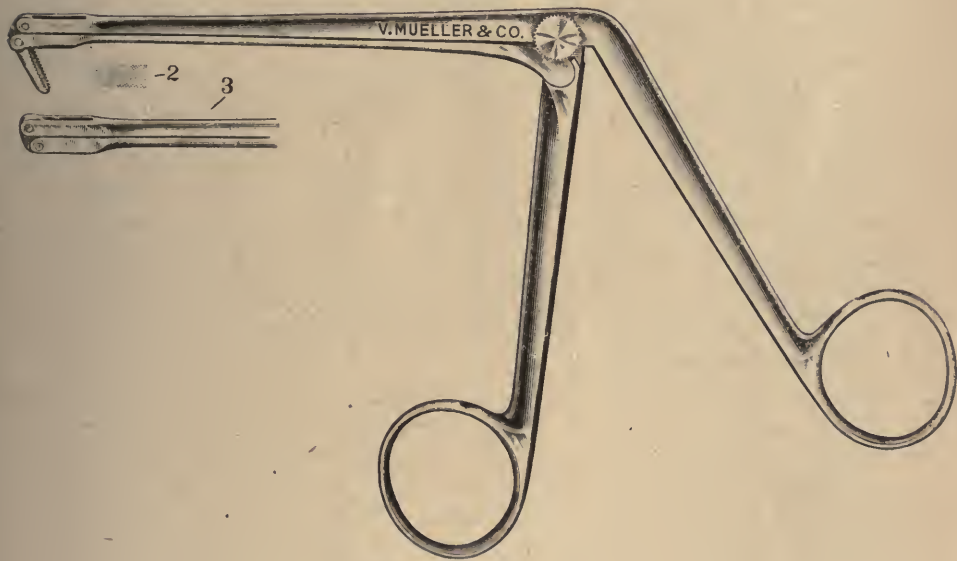


Fig. 2. Showing Method of Removing Inferior Meatal Wall.

this work, however, the more I favor medium surgery, that is, operations that take little of my patient's time, and cause him the least suffering, and are made rapidly and give good results.

By the use of my Reverse Antrum Bone Forceps, the technique has been very much simplified, and the operation only takes a short time, with no suffering for the patient. In all cases of Antritis, I nearly always remove the anterior end of the middle turbinate (of course, I exclude in this paper all cases that originate from the teeth), because I have never seen a case of Antritis

that needed surgical interference in which the anterior end of the middle turbinate was not enlarged, and by pressure obstructed the ostium maxillare. When the middle turbinate has been removed, the ostium is carefully examined with a probe in regard to size, etc. If the ostium is thought to be too small to allow sufficient drainage, either because of swelling of the mucous membrane at the edges of the Hiatus semilunaris, or by reason of the anatomical construction of the individual case, the infundibular groove is enlarged as formerly described by others, with Myle's exploring trocar or a strong probe-pointed knife, bent at right angles, which



is thrust into the ostium, and which ordinarily cuts the groove quite easy. However, if only this is done, the slit quickly heals, and the condition remains as before. At this stage, I insert the movable blade of my forceps into the Ostium, and, by cutting downwards and forwards, an opening can be made large or small by cutting away the Uncinate process, and in a very short time. If there should be any objection to removing any portion of the middle turbinate, the Ostium can anyhow often be enlarged as above described in selected cases, making this a most conservative operation.

In a great majority of antrum cases, however, it is best to operate through the inferior meatus. In this case, more or less of the anterior portion of the inferior turbinate is removed, and the antrum wall perforated with trocar, chisel, or trephine. The opening is very easily enlarged backwards and upwards, by using almost any nasal bone forceps, or more easily with the curette. If, however, it is not desirable to enlarge the opening backwards, or if it has been enlarged enough, then I use my Reverse Antrum Bone Forceps, and cut away quickly and easily the anterior portion of the antrum wall of the meatus, as far forward as desired, with no danger to the outer antrum wall, as there is with burrs or raspatories, and no pain or shaking of the patient. Through this opening direct treatment can be carried on to the antrum, as indicated.

The instrument is otherwise very handy in almost any nasal operation, such as the anterior ethmoidal cells, synechias, turbinal hypertrophies, etc.

My sincere thanks are due to V. Mueller & Co., of Chicago, who have experimented on the forceps since May, 1906, and finally brought it to its present state of perfection, combining great strength within small space. A more complete description of my method and the instrument will be published in a later paper.

People's National Bank.

SOCIETY PROCEEDINGS.
NEW YORK ACADEMY OF MEDICINE.
SECTION ON LARYNGOLOGY AND RHINOLOGY.

Regular Meeting, December 26, 1906.

T. PASSMORE BERENS, M.D., CHAIRMAN.

PRESENTATION OF PATIENTS.

Pedunculated Mucous Polyp Attached to Vocal Cord. By JOHN LESHURE, M.D.

The patient was a man 40 years of age, a native of Germany. His mother died of some affection of the stomach, probably cancer, at the age of 35. His father died of old age at 90. Five brothers living, all healthy. For several years, the patient has been subject to attacks of hoarseness, and for the past nine months has been constantly hoarse. He has had no cough, expectoration, or marked degree of laryngeal irritation. About three months ago he consulted a physician, who said he had a cyst of the vocal cords. Examination shows the mucous membrane covering the vocal cords to be deeply congested and somewhat thickened; and attached to the anterior portion of the right vocal cord is a narrow band of fibrous tissue terminating in a tumor, the size of a small pea. When attempts at phonation are made this is shot up between the cords, resting upon them, falling back below the level of the cords when the latter are separated. One physician told the patient that the growth was a papilloma and that if removed it would be followed by a cancer. Dr. Leshure advised removal, however. The fact of the tumor being pedunculated narrows the histological diagnosis down to myxoma or fibroma, and its soft character suggests the former.

DISCUSSION.

DR. QUINLAN said that the growth looked like a myxoma and he thought it should certainly be removed. All of these growths do harm from the irritation they cause to the surrounding tissue, which naturally becomes hypertrophic as a sequence of compensation.

DR. HURD advised the immediate removal of the growth (or the man would cough it up some day).

DR. HARRIS said that he had never seen a laryngeal growth that had so many marks of myxoma. He certainly would not call it a papilloma; it does not show any of the characteristics of papilloma.

DR. BERENS agreed that it was probably a myxoma and that it should be removed. He thought that the Section should be grateful to Dr. Leshure for forbearing to remove it and presenting the case before them for inspection.

Syphilis of the Larynx. By JOHN LESHURE, M.D.

Male, aged 30. Occupation, machinist. Father and mother both living and well. A sister died at the age of 31 years, of heart disease, and a brother died at 28 with what was called "throat consumption." Previous history of patient reveals rather marked addiction to alcohol and tobacco. Denies syphilis. For the past four years he has been subject to colds, accompanied by attacks of hoarseness, and for the past nine months has been constantly hoarse. There is some cough and expectoration, but a physical examination of the chest and microscopic examination of the sputum have proved negative as to tuberculosis. No rise of temperature nor loss of flesh and strength. Examination of the larynx shows infiltration of the tissues covering the left arytenoid, a proliferation of granulation tissue in the region of the left false cord, and some inflammatory oedema extending upward toward the epiglottis. Patient was given large doses of potassium iodide for over two months and mixed treatment for several weeks without influencing the condition. Suspecting possible malignancy, some of the tissue in the region of the false cord was removed, and proven by the microscope to be simple granulation tissue, no tubercle bacilli or giant cells being found. The laryngeal picture resembles tuberculosis more than syphilis, but the absence of pulmonary involvement and negative sputa make the latter diagnosis more probable.

DISCUSSION.

DR. THURBER said he had seen the patient when he first came to the Vanderbilt clinic. The lesion then looked more tubercular than it does now. There was the pale infiltration of the arytenoids and hypertrophy of the tissue in the posterior commissure and along the internal face of the left arytenoid body, which is no longer present. The man was put upon iodides, but the service changed, and he had not been able to follow up the case.

DR. LESHURE replied that the man was getting 36 grains of iodide of potassium three times a day, and there were no bacilli found in the specimen examined.

DR. HARRIS said that the case undoubtedly fell into the class of doubtful cases which were discussed a month ago—without clear tubercular or syphilitic evidence. He understood Dr. Leshure to say that no history of lues had been elicited, and that there were no signs of general tuberculosis in the patient. The lesion in the larynx does not appear to be a clear syphilitic lesion. It was difficult to account for the amount of infiltration, the bulging of the false cord, and the character of the ulcer. Dr. Leshure said that the man had a little pain recently. Emphasis has been laid on the absence of pain in syphilitic lesions. He did not think that the inference that it was syphilis could be drawn until the man had been subjected to large doses of potassium iodide, much larger than he is now taking. He would be inclined to administer hypodermic injections of salicylate of mercury and large doses of potash for two weeks, and we could then judge of the effect of the antisyphilitic treatment.

DR. MAYER suggested that nothing had been said about the possibility of malignancy. From the examination alone he would suspect malignancy. Time and again attention has been called to the fact that the first examination of specimens removed might not show malignancy, while a second examination of the growth would reveal this condition. From the general appearance, the case suggested to him malignancy rather than anything else. Of course, the man's age would make it an operable case, and it was important to establish a diagnosis as soon as possible. The patient has been thoroughly saturated with iodide of potassium, but the growth has evidently not been affected by a dosage of over a hundred grains daily.

DR. HURD said that it was important that a large piece of the growth should be removed and examined. He did not think that Dr. Leshure had taken a deep enough section.

DR. BERENS said that the growth appeared to him to be syphilitic. The fact of his having this infiltration with little or no pain, without glandular involvement, which might or might not show malignancy, together with his appearance, suggested syphilis. The man's apparent iodism was due to faulty diet and faulty administration of the iodide rather than to a real iodism. His stomach seemed to have been upset. A wineglass may mean almost any-

thing from a liqueur glass to a champagne glass. He would advise putting the man on rapidly ascending doses of iodide up to 160, 170 or 180 drops, three times a day, and administer it an hour before meals in peptonized milk, and keep him on any form of mercury, and keep his skin and secretions active. He thought that if under this treatment the man at the end of six weeks did not show a marked improvement, it would then be plenty of time to remove a large specimen of the growth for examination. There was no immediate need for haste, and if the growth was really syphilitic the more tissue that could be preserved the better. If it is nonspecific, it is probably malignant.

DR. QUINLAN inquired if any record had been kept of the man's temperature, etc.

DR. LESHURE replied that it was a dispensary case and it had been impossible to keep the patient under observation. As far as they had been able to tell, his pulse and temperature were normal.

DR. HARRIS said that he hoped Dr. Leshure would present the patient again at a subsequent meeting of the Section, as the following up of such cases was of great value to the Section.

DR. LESHURE said that he would like to say a few words in regard to a case which he had shown before the Section in March, a case of tuberculosis of the angle of the mouth and of the tongue. Some of the members questioned the diagnosis then, saying that it seemed to be syphilitic. The disease progressed and the man had another tubercular ulceration further back, on the dorsum of the tongue, and ulceration of both tonsillar pillars, and finally died of pulmonary tuberculosis—one of the most extensive cases of tuberculosis of the upper air passages that Dr. Leshure had ever seen.

Leukoplakia Buccalis, illustrated. By D. H. ABRAHAM, M.D.

Dr. Abraham said that he wished to bring again before the Section the very valuable work that was being done by Dr. Brown, one of the members of the Section, in preparing these beautiful illustrations.

The patient gives a history of syphilis which he has had for twenty years, although this seemed to be confirmed for only ten years. He has been an inveterate cigarette smoker, and when he first presented himself for treatment two weeks ago there was quite an extensive area involved. He was advised to give up cigarette smoking, and the affected area has slightly decreased in size.

DR. BERENS said that the case was an interesting one and the illustrations were certainly very beautiful.

Leptothrix Mycosis. By F. J. QUINLAN, M.D. (*Published in full in THE LARYNGOSCOPE, page 135.*)

DISCUSSION.

DR. HURD said that he had come to the meeting tonight hoping that Dr. Quinlan would have something new to tell in regard to the cause or treatment of this affection, but had been disappointed. He had seen a number of cases of this kind and had given a good deal of attention to the subject in six of them. One of the cases had a very marked keratosis of the throat, involving the tonsils, pharyngeal vault, Eustachian tube, lingual tonsils, and false cord, and this case he had reported before the Eastern Section of the American Laryngological, Rhinological and Otological Society two years ago. The x-ray was used about thirty or forty times, and the patient, who was a medical student, said that he felt better after each treatment. At first there was no apparent change, then the tufts became softer, but he went away for the summer to the country in the middle of the treatment, and came back with exactly the same picture of the throat—no new tufts, none gone. The x-ray treatment was resumed, and after a week or so the tufts began to disappear, and after five or six weeks they all disappeared; now, after three years, his throat remains well.

Another patient, a woman, had a fair amount of tufts on tonsil, on the post-pharyngeal wall and on the lingual tonsil. She was treated by the x-ray once or twice a week through the mouth and through the tissues of the throat. The tufts showed no change for awhile. Then they softened up and disappeared gradually.

In regard to the pathological side of the question, he did not think the leptothrix had much to do with it. He had sometimes found mycelia and sometimes found other fungi, but none seem to be constant, and not enough leptothrix to cause the trouble. Under the microscope, it looks like hyperkeratosis. The tonsil will have a keratosis running around its surface into the crypt. His explanation of the tufts was that the crypts simply fill up with this horny material, and we find breaks in it here and there. The crypts fill up and it shells out and protrudes. Some authors report it as falling off in the night, but he had never seen that happen. Under the microscope, however, you could see these breaks in the horny layer. The surface epithelial cells become more elongated and the nuclei more indistinct until the nuclei disappear and

the elongated cells form a bundle. The tuft becomes thicker and thicker, and finally comes off in long strips. It was very doubtful to him whether or not the condition was due to some chemical action, as the tufts are found in the nose and extend even through the tear-duct into the eye. No action of the saliva can touch these points. He did not believe that the leptothrix had been found in the eye or nose. He was inclined to believe that the leptothrix was secondary. It occurs in all sorts of people, some healthy and some unhealthy. The etiology is still a very open question, but I think that the x-ray is worth trying in severe cases, but the treatment must be continued for several months.

DR. LESHURE told of a case of a woman—a telephone operator who had extensive mycosis of the naso-pharynx. Her hearing had become somewhat affected, and the mouths of the Eustachian tubes were covered with a mass of growth. He could not say whether or not the telephone was an etiological factor in the case. Another patient, a young man of 21, had an infection extending down into the trachea from below the true cords. His larynx is wide open and the bifurcation of the trachea can be clearly seen.

DR. CHAPPELL said that he had not arrived in time to hear the paper, but the discussion of the treatment was of interest. It reminded him of how many times in this room he had listened to the subject of treatment and had gone home, believing that something must be the matter with his technique; but, after many trials of all that Dr. Quinlan had spoken of tonight, he had never seen any benefit derived from curettage, cautery, or burning with chloride of zinc, or acids; but on the contrary he believed they had done harm. He now gives such cases bichloride internally and sends them to the country, and has most gratifying results. He had a case last spring where it was very important that he should do something, and he tried everything possible without avail. The patient grew worse, and he finally sent her into the country with instructions to take bichloride internally, and in three weeks she came back well. He now treated all such cases in this way, giving them some simple treatment, and bichloride internally, and sending them to the country.

DR. HARRIS said that he was reminded by the last speaker of the many times this subject had been discussed before the Section in the last ten or twelve years, and especially of a paper by Dr. Wright, and it seems that the question of the etiology of the condition is just about where it was that evening ten years ago. Dr.

Wright then spoke of the question of hyperkeratosis. Dr. Delavan had then spoken of his success in giving no treatment except sending the patient away. His own experience was about the same as Dr. Chappell's, though sometimes by removing a part of the tonsil he had gotten rid of the disease, but not regularly. As for the other methods of treatment, he had given them up many years ago.

DR. MACKENTY said that in the past year he had seen three cases of this disease which Dr. Chappell's remarks prompted him to speak of. The diagnosis in one case was verified by Dr. Brooks; the others were not examined microscopically. Two of the cases were treated without result until they were sent to the country. They remained away for about two months and returned, one entirely well, and the other practically well. The third case was treated for six months by removing the visible points of disease with a curette and then applying Churchill's tincture of iodine. This case was almost well when treatment was discontinued.

In all these cases there were gastro-intestinal disturbances, and the condition of the gastro-intestinal tract is very important in its bearing upon the hygiene of the throat and mouth. All of the cases were put upon proper diet and enjoined to take exercise. It is important to look into the patient's general condition, especially the gastro-intestinal tract and correct the conditions there.

DR. MACKENTY said that last summer he had seen three cases of trichinosis with manifestations of an alarming nature in the larynx in one case. The condition puzzled him very much at first, for, besides having a very inflamed and edematous larynx with some infiltration of the arytenoid space, there was an acute condition in the lungs which simulated a subacute bronchopneumonia. After a week or ten days a blood count was made, and showed an eosinophilia of 50 per cent.; finally a piece of the muscle was removed, and trichinae were found. He intends to report these cases more fully later. Their mention here has not much bearing on the present paper, but trichinosis of the throat is not mentioned, so far as he knows, in the differential diagnosis of laryngeal cases.

DR. McCULLAGH said that he saw a case one day with one little plaque on one of the faucial tonsils, which was removed with a curette and preserved on a slide, and then cauterized the place with a little orthochlorphenol. The microscopic diagnosis showed leptothrix in the secretion, but the one cauterization relieved the condition, and there has been no recurrences.

DR. ABRAHAM said that in all of his cases of leptothrix the lymphatic tissue of the upper respiratory tract were involved, and there were lymphoid hypertrophies of the post-pharyngeal wall. When he first began this specialty he was very enthusiastic to try everything he read of in the treatment of the disease, until one day Dr. Delavan suggested simply giving the patient a good dose of podophyllin and sending them away into the country. Acting upon this advice, nearly all the cases recovered without any treatment, and did much better than those where he had tried the various acids. Only a few weeks ago he had seen a case in a school teacher, a very intelligent woman, who was a little run down, and had a lot of leptothrix scattered over her tonsils. She was sent into the country for two weeks and returned practically well. A week or so ago, she had written that she was suffering from some gastro-intestinal trouble, and she now complains again of the leptothrix.

DR. QUINLAN, in closing the discussion, said that the keynote of the whole condition was struck in the argument for the correction of errors of respiration and alimentation. It was astonishing to know the number of young girls budding into womanhood who were affected in this way, and who were cured by taking cold baths, proper exercise, and correcting candy habits and other errors of eating. Many others have lymphoid tissue occluding the nostrils, thereby preventing them from taking deep draughts of oxygen, and by toning up their subjective condition and giving them an equipment with which to fight the conditions, they will be greatly helped. These measures could not always be depended upon entirely, but they were valuable aids to local therapy.

In presenting this paper he had not attempted to present any original views, but had merely collected the results of recent investigation, and tried to classify the facts, with the idea of seeking the direction from which most light could be gained, provoking at the same time just such a discussion of the subject as had been elicited, from men who had seen many more of these cases.

Primary Carcinoma of the Inferior Turbinate, with Report of a Case. By WILLIAM WESLEY CARTER, A.M., M.D.

A more serious or important duty seldom comes to the rhinologist than that of making an early diagnosis in cases of suspected malignant disease of the nose. The disease is so insidious that its true nature is seldom recognized early enough to admit of its complete removal by operation, for the mortality is practically 100%, including both operative and nonoperative cases.

Primary malignant disease of the nose is rare and usually occurs in the ethmoidal or sphenoidal region. The case presented, therefore, is one of the rarest, as the disease is primary and in the lower part of the nose.

The patient was a married woman of 38, who applied for treatment in the Manhattan Eye, Ear and Throat Hospital in October.

Her family history is good and she had always been well up to the beginning of her present illness five months ago. This began with a tickling sensation in her right nostril and a constant desire to blow her nose. This was shortly followed by frequent spontaneous hemorrhages and occlusion of this nostril. She applied for treatment at a dispensary, where a growth was removed from the right nostril. She was relieved for the time, but all the original symptoms returned in four weeks. The growth was removed a second time by a private physician, who found that it was cancerous.

The woman appeared at the hospital three weeks after the last removal of the growth. She was in good physical condition and showed no signs of cachexia.

Examination of the nose showed a cauliflower-looking mass attached to the right inferior turbinate and filling the nasal cavity: it could not be seen by posterior rhinoscopy. There was a serous, odorless discharge. Otherwise the nose and its accessory cavities seemed normal.

Microscopical examination of the growth showed it to be a typical columnar-celled epithelioma.

Believing that a cancer of five months' standing or longer must have so seriously involved the adjacent tissues and especially the antrum, that an excision of the superior maxilla would be necessary, the case was referred to a general surgeon.

On October 4th, Dr. McCosh performed the following operation, the writer being present:

Ferguson's incision, reaching from the inner canthus of the right eye down by the side of the nose and through the upper lip, was made. All the tissues were elevated from the anterior wall of the antrum, and the soft tissues of the nose from the margin of the nasal cavity. The nose could then be pulled to the left, giving a good view of the field and showing that the growth was confined to the inferior turbinate.

The whole of the external wall of the nasal cavity, a portion of the floor, the middle and inferior turbinates and a large portion of

the anterior wall of the antrum were removed. The operation extended far beyond the invaded area, which was the anterior two-thirds of the inferior turbinate. The external wound was closed and drainage effected through the nose. The patient was discharged from the hospital fifteen days after the operation. From examination of the specimens removed at time of operation, the diagnosis of cancer was confirmed by the pathologist of the Presbyterian Hospital. At the present time, three months after the operation, there has been no recurrence.

Points of interest in the case are:

1st—The extreme rarity of cancer of the nose, and especially of the inferior turbinate.

2d—The early age at which the growth appeared (it being almost unheard of before the 45th year).

3d—The age, location and extent of the growth seemingly being favorable for complete removal, we have here a fair opportunity to test the efficiency of the radical operation to cure malignant disease of the nose.

The first case of cancer of the nose was reported by Robin in 1852. As late as 1869, FINDER, Cornil and Ranvier denied that malignant disease ever originated in the nose.

Dreyfus, who considers only those cases that have been confirmed by the microscope, states that out of 9,554 malignant tumors of the entire body, there were only 19 of the nose. Of these 15 were sarcomata and 4 carcinomata.

Herzfeld observed one case of carcinoma in 28,000 patients, and FINDER observed 10 sarcomata and 4 carcinomata in 28,000 patients.

Maljutin states that out of 125 malignant tumors of the nose collected by him, only 17 were carcinomata.

Dr. Carter states that the total number of recorded cases of primary carcinoma of the nose to date is 98, this, however, includes the accessory cavities. It was difficult to separate these, as so much tissue was involved in many of the recorded cases that it was impossible to tell the real origin of the growth. It is probable, however, that the origin in most of these cases was in the sinuses, as this occurs much more frequently.

Sex has no appreciable influence in the etiology of the disease. Trauma is of doubtful importance. Irritated areas in the nose from which polypi have been removed have seemed to be the starting place in one or two cases.

There has been much discussion as to whether cancer is developed from polypi. Since polypi occur in 10% of nasal cases, it is more than likely that the two will sometimes occur together. Dr. Carter states, however, that we cannot overlook the possibility that long-continued irritation here, as in other parts of the body, may predispose to malignancy.

Some evidence has been presented to show that cancer may be developed from such benign growths as adenomata and papillomata after the cancerous age has been reached, and when they have been subjected to long-continued irritation. His evidence, however, is by no means conclusive.

Headache, nasal obstruction and repeated hemorrhages are the earliest symptoms.

Pain, at first neuralgic, later deep and boring in character, is a late symptom; it is present early if the growth is in the upper part of the nose.

The *discharge* may be serous, bloody or purulent and fetid. When the sinuses are involved, the early symptoms are those of empyema of those cavities.

Infiltration is not as rapid as in other parts of the body, but there is a tendency for the disease to extend upwards along the lymph channels that communicate with the subdural and subarchnoid spaces. Many of the cases terminate from cerebral involvement. Recurrence is rapid after incomplete removal; in Dr. Carter's case the growth returned in four weeks on both occasions when it was partially removed.

Metastatic deposits seldom occur.

Glandular involvement does not occur as often as in malignant disease in other parts of the body. From an anatomical point of view, the lateral pharyngeal gland, the gland in front of the axis, and the glands near the greater cornu of the hyoid bone, should be the first involved.

Cachexia is a late symptom.

In making the *diagnosis*, we must differentiate from sarcoma, benign tumors, tuberculosis and syphilis, also from chronic inflammatory conditions.

There should be immediate co-operation between clinician and pathologist in suspicious cases, and when a diagnosis of cancer is made the radical operation should be performed immediately after the removal of the specimen for microscopical examination, lest

the cancer cells liberated by this traumatism should be taken up by the blood vessels and lymphatics and disseminated beyond the intended operative field. Cells thus taken up have been seen in the vessels by several pathologists.

The *prognosis* is bad. There is no authentic case on record where recurrence has not taken place after the operation; often the recurrence has taken place before the patient was able to leave the hospital.

The *duration* of the disease depends upon the age of the patient and the nature and location of the growth. The disease progresses more rapidly in the aged and when it is located in the upper part of the nose. The medullary and adeno-carcinomata are the least malignant and last the longest. The average duration of the disease is three years; exceptions are seven months, and fourteen years. The only variety offering any ground for favorable prognosis is the so-called cylindroma of Billroth.

Radical operative treatment alone should be considered in dealing with these cases. The dangers of the operation are hemorrhage, pneumonia, erysipelas, sepsis and meningitis. The choice of operation should be made according to the location and extent of the growth, and with a view to giving access to the greatest amount of nasal tissue. Intranasal operations are useful only as palliative measures. In some cases a modified Caldwell-Luc operation may be effective. Where both sides are involved, Ollie's operation, which consists in sawing through the nasal bones and turning the nose forward on the face, is to be preferred. When the antrum is involved, excision of the superior maxilla is the only operation to be considered.

DISCUSSION.

DR. HARRIS said that he had been much interested in two points brought out in this carefully prepared paper. The first was the question of degeneration from benign growths. He himself had been much interested in the observation of malignant diseases of the nose, but had never yet seen a pure case of carcinoma, though he had seen two cases of adeno-carcinoma—one of them in a man over 70 years of age. In this case, the diagnosis at first was adeno-sarcoma. The patient lived for a year after he came under Dr. Harris' care, and died from a general breaking down of the system.

In regard to papilloma, he recently had been looking up the statistics on this subject, and, as far as he could find, it was an exceedingly rare affection. He had only been able to find 8 or 10

cases of true papilloma, and these did not show any great tendency to degeneration. Some six or seven years ago he had looked up the statistics of sarcoma, and found 104 cases, including 6 or 7 of his own. It is acknowledged by all that sarcoma is a more common affection than carcinoma. If that is so, it hardly seems possible that 80 cases of carcinoma could be collected. He was inclined to think that these 70 or 80 cases represented cases of the accessory sinuses, and he would suggest to Dr. Carter that in completing the paper for publication he indicate as far as possible the number of cases of undoubted primary carcinoma.

DR. CARTER, in closing the discussion, said that Dr. Harris was correct in stating that there were not so many cases of primary carcinoma of the nose as had been mentioned in the statistics. He had intimated in his paper that the number was too large, as many of the cases included had never been examined with the microscope and there was some question as to the diagnosis. And then again carcinoma of the accessory sinuses was included, and this is generally admitted to be much more frequent than that of the nose. Primary carcinoma of the nose is an extremely rare condition. In these statistics it is difficult to separate the cases of primary disease of the nose from those of the accessory sinuses, for in some instances the tissues were so generally involved that it was impossible to locate the real origin.

A New Tonsillotome. By FRANZ C. RUPPERT, M.D. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)

DISCUSSION.

DR. CARTER said that he did not see much advantage in the instrument, as the cutting blade has to be pulled forward and the shoulder of this is opposed by the anterior pillar. If this were rigid, the instrument could not be used at all. He did not see much advantage over the old-style tonsillotome which is pushed in to catch the tonsil.

DR. BERENS said that the instrument was certainly a very clever device.

DR. McCULLAGH said that as the anterior pillar is not rigid, it can be pushed aside by the ordinary flat tonsillotome if sufficient pressure is made, and he thought that the blades of the ordinary Matthieu could be gotten down about as close to the capsule of the tonsil as this one.

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY.

Regular Meeting, December 11, 1906.

OTTO T. FREER, M.D., President.

Post-Mortem Findings of a Cerebellar Abscess Causing Sudden Death. By JOSEPH C. BECK, M.D.

The pathological specimen is still in a fresh state and consequently a full description is impossible at this time, owing to the fact that I do not wish to disturb the brain until it is properly hardened. I present it, however, as we have not many opportunities to see such, and, secondly, because I wish to report the clinical side of the case, which was very interesting to me.

Jos. W., 19 years old; has had a running ear on the right side ever since childhood, following measles. The discharge was very thick and foul-smelling. He was never treated for it, and it never bothered him until he got a cold, six weeks ago, when a dull ache developed on the right side of his head, which constantly increased until the operation.

October 28, 1906.—Pain almost unbearable. Dr. L. J. Hughes, my assistant, who saw him at this time, made the following notes of his findings: The external auditory canal is swollen and stenotic; foul-smelling pus fills the canal; granulations appear to take the place of the tympanic membrane, and the upper and posterior wall of the auditory canal seems to sag. The hearing is markedly reduced for air and also bone conduction. (Special mention is made that there are no symptoms of dizziness, noises, or nystagmus, or other eye findings in this case.) No tenderness over the mastoid, but some tenderness over the region of the zygoma on percussion. Temperature, 97°; pulse, 55-60. Slight cough.

Deviated septum to left and a general naso-pharyngitis. General condition below par, due to loss of appetite and sleep.

I saw the boy on October 30, 1906, and found the conditions as stated above; recommended immediate radical operation, believing there was a necrosis of the temporal bone through the tegmen tympani with involvement of the mastoid. I expected also to find a fistula going towards the cerebellum, inasmuch as he had a sub-normal temperature and slow pulse.

November 1, 1906.—Patient was operated on, and I found a large colesteatoma, which I was able to eradicate completely, finding no evidence of necrosis of the tegmen tympani or any other part. I concluded the operation and put the patient to bed in good condition. Next morning his report was: "Rested well; temperature, 99°; pulse, 60." From that day until the evening before he died, which was nine days in all, he had no headache, and otherwise felt well. The wound was such as we usually find in such cases. On the fifth day following operation, there was a slight evidence of facial paresis, which I attributed to the tight packing. The pulse and temperature remained about the same all the time; temperature, 97°; pulse, 50-60.

On the evening of the eighth day after operation he complained of some headache, which continued all night and the next day. I left him, however, in the evening while he was eating a hearty meal. About 5 a. m. next day, I was called up and notified that he had given a sudden shriek, got blue, and died.

A necropsy was performed as quickly as possible, in order to prevent post-mortem changes, and I found the field of operation in excellent condition, and no evidence of a fistula or necrosis. On removing the calvarium I found normal meninges. In severing the tentorium cerebelli and turning out and back the brain, I discovered a small opening in the right half of the cerebellum, close to the median line, from which pus escaped, and on enlarging this opening I got about two tablespoonsful of this pus. Measuring the cavity, as you see, with this probe, it is about $2\frac{1}{2}$ inches in one direction, and $1\frac{1}{2}$ inches in the other. It appears to burrow toward the fourth ventricle, but that I shall determine better later, when the brain has been properly hardened. I should like to explain his sudden death by the rupture of this abscess into the fourth ventricle. The sinuses were absolutely normal. There were no evidences of any necrotic areas from the attic or mastoid cells anywhere. I chiseled open the semicircular canals and cochlea; also facial canal, and macroscopically found no evidences of disease.

I am inclined to think that the infection must have passed from the mastoid cells through some very small opening and infected the cerebellum. This abscess very likely has existed for a long time, in a quiet state, but the mastoid operation may have set up fresh activity and caused it to rupture.

DISCUSSION.

DR. GEO. E. SHAMBAUGH: This interesting specimen which Dr. Beck has demonstrated brings before us in an impressive way one of the most serious results of chronic suppurative otitis media. This abscess is located in that part of the cerebellum which comes in relation to the posterior surface of the pyramid of the temporal bone. This is the place where cerebellar abscess arising from suppurative ear disease is most often located. The duration of this abscess is uncertain from the clinical history. It is a surprising thing that an abscess as large as this could be located in a structure like the cerebellum without having produced very pronounced symptoms. Yet it is well known that brain abscess may occur in chronic suppurative ear disease and exist for a long period without causing any very pronounced symptoms.

How the infection got to the cerebellum in this case is an interesting question. It is not unusual that no passage is discovered at the time of operation. There are, of course, a number of routes by which a cerebellar abscess is known to arise. One is by extension through the lateral sinus, this structure being first involved; another is by the way of the labyrinth, which is involved in the suppurative process, and the extension occurs to the cerebellum either along the meatus internus or along the aquaeductus cochleæ or aquaeductus vestibuli. I should like to ask Dr. Beck whether any symptoms were noted in this case suggesting the possible involvement of the labyrinth.

Aphonia of Unknown Origin and of Six Months' Duration in a Two and one-half year old Child; Discovery of an Open Safety-Pin in the Larynx. By JAMES T. CAMPBELL, M.D.

A foreign body in the larynx, causing aphonia, is rare indeed. Symptoms vary according to the size and shape of the foreign body. Small bodies, such as fishbones, may remain in the larynx for an indefinite length of time without interrupting respiration, and will merely give rise to coughing and a sensation of discomfort.

Generally there is great anxiety and terror on the part of the patient accompanying the entrance of any foreign body, however small, into the air passages.

As a rule, the history of the case is clear, and the laryngoscope will verify or disprove the patient's statement. Where there is a doubt, a skiagraph should decide the case in question.

The little girl was given a dose of castor-oil by her father while her mother held her. Violent coughing immediately ensued and persistent aphonia resulted. Six months later she was brought to me. She was anesthetized, and with the laryngeal mirror I saw a metallic body lying on the upper surface of the right vocal cord. With the Schroetter tube forceps I grasped this body and withdrew an open safety pin 23 mm. in length and 15 mm. in extreme breadth.

Thirty-six hours later the child was taken home, speaking as plainly as before the castor-oil episode.

Trypsin Treatment of a Case of Malignant Disease Involving the Left Tonsil, Base of Tongue and Epiglottis. By JAMES T. CAMPBELL, M.D.

The author concludes from the relative distribution of cancer of the alimentary tract, that the pancreatic ferments and bile salts might be supposed to have an inhibiting or preventative action on cancer. He then reviews the experimental work of Dr. J. Beard upon mice infected with Jensen's Mouse Tumor, in which injections of trypsin were used with marked effect upon the tumor. Beard's recommendations as to the proper method of administering *Injectio Trypsini* and *Injectio Amylopsini* in human beings are given, and the encouraging results of this method as used by Dr. William J. Morton in twenty-nine cases.

Dr. Campbell then reports at some length his experience with *Injectio Trypsini* and *Injectio Amylopsini* in treating what was apparently an inoperable carcinoma of the base of the tongue, left tonsil, and epiglottis. The improvement was marked, pain subsided, and swelling and induration were greatly reduced in the seven months preceding the report. Unfortunately the diagnosis of carcinoma was not confirmed by microscopic examination.

DISCUSSION.

DR. OTTO T. FREER: We are greatly indebted to Dr. Campbell for reminding us of the possible usefulness of trypsin in the treatment of malignant tumors. Nevertheless, the absence of a histologic diagnosis in the case he presents to us deprives it, to my mind, of any claim to represent the effect of the remedy upon carcinoma, for there are so many conditions in the throat that to the naked eye may simulate a malignant epithelial neoplasm, not to speak of the possibility of sarcoma, that the diagnosis from chronic inflammatory round-celled infiltration of the arcus palatoglossus or palatopharyngeus surrounding the tonsil, or the specific granu-

lation tumors, may be impossible by mere inspection, so that, while one may feel reasonably sure of the presence of a beginning carcinoma, to convince others it is necessary to have the sustaining evidence of the microscope.

I suggest that Dr. Campbell follow up the subject and excise tissue for a histologic diagnosis in future cases before he uses the trypsin. It does not, however, seem to me that much will be accomplished with the remedy, for while central parts of a malignant growth of low vitality whose nutrition is impaired because of occlusion of vessels may be digested by the ferment, the vigorous malignant epithelial cells at its periphery will offer at least as much resistance to the solvent action of trypsin as the cells of the normal tissue embedding them.

DR. JOSEPH C. BECK: I should like to know the occupation of the patient, whether he ever worked with hides or cattle.

DR. CAMPBELL: He was a clerk and brassworker.

DR. BECK: Then I should like to ask the doctor if the tissues were examined microscopically for the ray fungus?

DR. CAMPBELL: Yes, and not found.

DR. BECK: I only wish to say that actinomycosis cannot be otherwise excluded. Patients who have such bad teeth as this patient has and had may easily get infected with the actinomyces. Besides, this growth is firmly connected with the lower jaw. That the patient got so much better under the treatment and is still improving, may also speak in general against carcinoma, because in the few cases that I know of where trypsin, nucleinic acid, methyl blue and several other similar substances have been found to benefit the patient, the effect of these drugs soon passed off, and if the condition was cancer it rapidly grew and destroyed the life of the patient.

DR. SHAMBAUGH: The first case reported by Dr. Campbell is a most interesting one. The probable diagnosis of carcinoma in the absence of the histological findings has been in this case substantiated as nearly as could be possible from the clinical history. The manner in which the improvement followed the administration of the treatment seems to me to justify the assumption that the improvement was most probably the direct result of this treatment.

DR. CAMPBELL, closing: There is reasonable proof that there is no possibility of the disease being actinomycosis in the fact that there has been no tendency toward breaking down of the tumors into abscesses. Also, that, in careful microscopical examinations

made by Prof. Zeit, no ray fungi were found. For lumpy-jawed cattle large doses of potassium iodid have been given with success, and similar treatment should prove beneficial when used for human beings who suffer with actinomycosis. In the case presented, however, very large doses of the iodid were given without success, and he gradually became worse.

It is not a fact that 28% of mice suffering from Jensen's mouse-tumors recover. They all die! When superficial ulceration of the tumor occurs, emaciation rapidly ensues. Ehrlich claimed that 30 or rarely 40% of mice were successfully inoculated with Jensen's mouse-tumor. Bashford, however, repeatedly obtained success in 90% of his attempts.

A Peculiar Defect of Speech Following, and Partially Attributed to Diphtheria. By ELMER L. KENYON, M. D.

Dr. Kenyon presented the patient in whom this condition existed. The defect consisted of a marked, rough, nasal, gurgling sound in place of the normal s and z sounds. The probable etiology and the treatment were covered fully. A complete report will be published later.

DISCUSSION.

DR. OTTO T. FREER: The Society owes Dr. Kenyon gratitude for this able and clear presentation of a new subject. So much that appears on programs is a monotonous repetition of what has gone before that it is refreshing to find a new theme so ably handled.

Sinus Thrombosis and Necrosis of the Horizontal, Semicircular and Facial Canals, following Chronic Purulent Otitis Media, Cholesteatoma, Peri-Sinus Abscess, Resection of the Jugular Vein, Radical Operation, Recovery. By LOUIS OSTROM, M.D. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)

DISCUSSION.

DR. H. KAHN: This evening, in two instances, that of the demonstration of the cerebellar abscess and the paper now under discussion, a note on the presence or absence of nystagmus has been omitted. The present state of otology recognizes this symptom as of great value in the diagnosis of suppurative affections of the static portion of the labyrinth, and of some use, especially in the differential diagnosis of cerebellar abscess. This has been brought out by Barany, in an exhaustive paper in the *Monatschrift für Ohren-*

heilkunde, by Neuman in the *Archiv. für Ohrenheilkunde*, and Friedreich in his monograph on Labyrintheiterung. All of the before-mentioned authors agree that in diseases of the static apparatus, when the eyes are rotated upward and outward to the opposite side, a rotary nystagmus appears, which is absent when the eyes are turned toward the affected ear. Cerebellar abscess produces exactly the opposite phenomena, i. e., nystagmus, when the eyes are rotated to the affected side and none when turned to the opposite side.

The point emphasized, that the patient hears after destruction of a part of the labyrinth, is, of course, open to doubt, and I am of the opinion that the doctor has deceived himself, since it is well known that it is difficult to prove a one-sided deafness when the other ear is normal.

DR. JOSEPH C. BECK: In regard to the allusion of the previous speaker that I did not say much about the nystagmus in my case of cerebellar tumor, I wish to plead guilty that I did care more to open that mastoid as quickly as possible, in order that I might save his life, rather than to scientifically examine the case. Next time I promise to do better.

DR. SHAMBAUGH: There are several points I would like to refer to in the interesting case reported by Dr. Ostrum. In the first place, I am not convinced that the patient was able to hear in the affected ear after his recovery from the operation. That the labyrinth may be invaded by a suppurative process and there still be preserved the ability to hear, is a phenomenon we sometimes see, in cases, for example, of cerebro-spinal meningitis which extends along the meatus internus to the cochlea and where, after recovery, there are sometimes left more or less extensive islands of hearing. Whether it is possible for any hearing to be present where there exists a gross lesion such as is reported in this case where a fistula existed in the labyrinth from which pus was seen to exude, is quite a different matter.

The extreme difficulty in excluding the well ear in testing the hearing in cases of one-sided deafness, especially where it is a question whether or not there is a total defect in the one ear, leaves in my mind a margin of doubt whether this case could hear in the affected ear.

There is just one point in the handling of the case I would criticise; that is the primary closure of the opening back of the ear. Such a closure is of great assistance in the after-treatment

of many cases where the radical operation has been performed, but such a closure is not suitable for all cases operated on by the radical method. In this particular case there were two contraindications to this primary closure, either one of which should have been sufficient cause for leaving the wound open. One was the presence of a cholesteatoma and the other was the fact that the sinus was exposed over a considerable area and its surface was bathed with pus which left the possibility of a sinus involvement still present.

PRESENTATION OF INSTRUMENTS.

- a. **Simple Epiglottis Retractor.**
- b. **Bernays' Sponge with Attachment for Easy Extraction.**
- c. **Localizer of Superior Oblique in the Killian Operation.**
- d. **Posterior Submucous Elevator.**
- e. **Self-Retaining Nasal Retractor.**
- f. **Simple Nasal and Post-Nasal Packing.**

By LOUIS OSRRON, M.D. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)

DISCUSSION.

DR. JOSEPH C. BECK: I wish to compliment the doctor on the many practical devices he has shown us tonight; particularly this instrument to localize the pulley of the superior oblique. When I operate next by the Killian method, I want to have one of these instruments at hand.

I cannot agree with the previous speaker that the removal of the pulley is of no consequence. I know it is productive of a squint and diplopia, which is permanently present in most of the cases that I have seen, and, if possible, is to be avoided. However, at this point, I wish to say that in my last case of radical sinus operation for pan-sinusitis, I followed the advice of Coakley and many others in not removing the floor of the frontal sinus over the orbital cavity, only so much of the floor and back into the ethmoid cells as to get perfect drainage, and had a good result without any chance for infectious cellulitis or displacement of the eyeball.

As to post-nasal packing, I use the Bellox canula and cotton tampon, and cannot report anything but success with it when called upon to use it.

DR. H. KAHN: The instrument shown for the localization of the superior oblique muscle when doing the Killian operation on the frontal sinus may be very valuable, if the typical operation is performed, but the modification proposed by Hajek in a recent number of *Fraenkel's Archives* makes it unnecessary. Following this modification there is a diplopia for a short time, but this soon disappears, and the patient is no worse for having had his superior oblique detached.

DR. OTTO T. FREER: I wish to especially commend Dr. Ostrum's very ingenious use of the rubber band to uplift and pull forward the epiglottis during endolaryngeal manipulations. I have found in a number of cases great difficulty in removing papillomata growing on the anterior third of the cords where the epiglottis overhung the larynx in a decided manner, and I think that Dr. Ostrum's device will be of great use in such cases.

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ORIGINAL COMMUNICATIONS.

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(that they are contributed exclusively to THE LARYNGOSCOPE.)

A STUDY OF THE ETIOLOGY OF INFLAMMATORY DISEASES OF THE NOSE AND ACCESSORY SINUSES.*

BY WILLIAM LINCOLN BALLENGER, M. D., CHICAGO.

Introductory Remarks.—I have long been of the opinion that the causes of the inflammatory diseases of the nose and accessory sinuses have not been systematically presented in any work on rhinology. Believing myself incapable of elucidating the subject in a logical and convincing manner I have, heretofore, refrained from formulating my ideas in writing. In my lectures at the College of Physicians and Surgeons, I have more than once given utterance to them, and have finally concluded to place them in writing with a view of inviting my confreres to criticise, or to refute them if they do not appeal to their judgement or coincide with their experience.

My views are based upon clinical observations and upon well known laws relating to inflammatory processes. I am emboldened, therefore, to present them to this body of distinguished rhinologists for their approval or disapproval.

INFLAMMATION.

Before discussing the causes of inflammation, it will be well to define what inflammation is.

Acute inflammation.—Acute inflammation is a three-fold reaction excited by the presence of certain noxa, or irritant material, in the tissues. The noxa or irritant is usually a pathogenic micro-organism and its toxin, or it may be of chemical or traumatic origin. When

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of chemical or traumatic origin the irritant primarily consists of the dead or broken down cells of the tissues.

Dead or broken down cells when present in the tissues in excess become foreign bodies, and as such, a reaction of the living cells is excited for the purpose of eliminating them from the body. Furthermore, the dead cells in the process of disintegration give off a ferment or chemical substance which also excites a reaction, the purpose of which is to free the tissues of its presence. The reaction thus far excited is directly traceable to the presence of dead and disintegrating tissue cells. Ordinarily, after a short time, a secondary irritant gains entrance to the injured tissues and becomes the more important factor in the reactionary process. That is, pathogenic bacteria infect the impaired tissues so that in nearly every acute inflammatory process, whether it is due to primary infection or to chemical or mechanical trauma, pathogenic micro-organisms must be regarded as the paramount exciting or noxious agent causing the reaction of inflammation.

The reaction of inflammation is, therefore, an increased physiological activity of the living tissues of the body for the purpose of disposing of a noxious or irritant substance or organisms that have invaded them in excess of the normal quantities.

The reaction of acute inflammation is a three-fold process, namely:

1. Increased hyperaemia.
2. Increased nutrition (increased resistance).
3. Increased leukocytosis.

1. Increased hyperaemia is a constant and important reaction as through it the cells are provided with the extra nutrition they need under conditions of stress. The increased blood supply also stimulates and facilitates the increased migration of leukocytes, and it flushes the poisoned area and dilutes the noxious substance and thus reduces the intensity of the irritation. The hyperaemia is nearly always passive in type. It has been demonstrated that passive hyperaemia is more potent in overcoming bacterial irritation than active hyperaemia, though active hyperaemia when well established is also very efficient.

2. Increased nutrition of the tissues is prompted by the hyperaemia for obvious reasons. They are under stress because of the presence of noxious substance, and need extra nutritional facilities. Their vital force, or **resistance**, is not **equal** to the emergency **placed** upon them and upon their resistance depends the issue of the warfare. Their means of defense may be characterized as two-fold,

namely, (a) their ability to envelope and digest micro-organisms, and (b) their ability to produce and emit a biochemical substance or ferment, the purpose of which is to weaken or destroy their foe. This all requires increased nutrition (blood) which begets increased powers of resistance.

If the nutrition is not adequate for these purposes the micro-organisms and their toxin or biochemical irritant, may cause destructive, and what we are accustomed to call pathogenic changes in the tissues.

3. Increased leukocytosis is also an important reaction of inflammation. While the function and modes of activity of the leukocytes is not fully understood it has been fairly well demonstrated that the polymorpho-nuclear leukocytes envelope and destroy bacteria, while the lymphocytes envelop and destroy broken down cells. Other cells as the fibroblasts also participate in these functions under certain conditions. I have not the time to enter into a discussion of all the processes included in the reaction of inflammation and only desire to briefly suggest the more important and well known processes in order to prepare our minds for a clearer understanding of the etiology of the inflammatory diseases of the nose and accessory sinuses.

Parenthetically I wish to add one additional statement concerning the adequacy of the reaction of inflammation. According to Adami the reaction of inflammation may be of three types:

1. Adequate reaction.
2. Inadequate reaction.
3. Excessive reaction.

The reaction is usually inadequate. That is, the increased hyperaemia, cell nutrition and migration of leukocytes is insufficient to dispose of the pathogenic micro-organisms before they have caused considerable damage to the tissues. It follows, therefore, that in the treatment of inflammatory diseases the reaction of inflammation should be promoted rather than diminished. By so aiding the defensive and offensive activities of the tissues, the bacteria, their toxins, and the broken down tissue cells may be speedily removed, and a cure effected.

Inflammation Affecting Mucous Surfaces.—Adami says: "The main distinguishing feature of the mucous surface is the presence there of a layer of mucous cells, cells of a glandular type, capable when stimulated of forming and discharging relatively large amounts of mucin. The hyperaemia, the exudation of serum, the migration

of leukocytes, all these occur in the submucous layer just as in the subserous layers. The changes in the reaction are due solely to the interposition of this layer of mucous cells. There is, in the first place, a more definite basement substance interposing a certain amount of resistance to surface exudation. The layer of mucous cells is more complicated, and although the fully developed cells may be discharged, they are apt to remain relatively undifferentiated 'mother cells' at the base; or otherwise the same intensity of irritation does not lead to as extensive a denudation. And, thirdly, by the combined action, it may be, of the irritant and of the hyperaemia, the fully formed mucous cells are stimulated to produce increased amounts of mucin, so that an inflammation of moderate grade is characterized by an abundant amount of mucinous discharge rather than of fibrinous deposit."

"We speak of such a moderate case, with exudation of serum containing abundant mucin, cast-off mucous cells, and relatively few leukocytes, as a 'catarrhal inflammation,' if there be sufficient leukocytes extruded, the character is altered to that of a 'mucopurulent inflammation;' if more severe, with complete destruction of the mucous membrane proper, then, as in serous surfaces, there is the same tendency for the leukocytic exudation to favor a deposit of fibrin upon the surface, and then we obtain a 'membranous inflammation.'"

"Despite the fact familiar to all that diphtheria is a disease set up by a specific bacillus, and the equally well-known fact that a like membranous inflammation may be induced by several forms of microbes, we still commonly speak of such a membrane as being diphtheritic. It would be better to confine this term purely to cases in which we know that the bacillus diphtheria is the causative factor; failing this, we may accept the term diphtheritic as covering all such membranous inflammation, and employ the term diphtherial for such cases as are of pure diphtherial origin.

"Further, if there be yet more severe destruction of the surface cells, this may go on to ulceration. Where we have pyogenic organisms present, there is a dissolution and breaking down of any fibrin that is formed and consequent absence of a membrane. In such cases there is a distinct tendency for the process to extend in the submucosa beneath the still intact mucous membrane, the part becoming infiltrated with pus. This form is spoken of as 'phlegmonous inflammation.'"

Chronic Inflammation.—The reaction of chronic inflammation consists of the following phenomena:

- a. Slightly increased hyperaemia.
- b. Slightly increased cell nutrition.
- c. Slightly increased migration of leukocytes.

It is needless to add that the reaction is inadequate to remove the noxa or irritant which according to pathologists is usually bacteria of low virulence. There is usually a local obstructive lesion of the nose in chronic inflammation.

A product of chronic inflammation that is always present is the proliferation of fixed cells, usually of the least differentiated type, namely, connective tissue cells.

THE ETIOLOGY OF INFLAMMATORY DISEASES OF THE NOSE AND ACCESSORY SINUSES.

Having thus briefly defined inflammation we are prepared to discuss its causes.

The causes of inflammatory diseases of the nose and accessory sinuses are divided into two groupes, namely:

1. Exciting causes.
2. Predisposing causes.

1. *Exciting Causes.*—The exciting causes are bacteria, and chemical and traumatic destruction of tissue cells. This phase of the subject has already been discussed under Inflammation and will not be dwelt upon in this connection further than to say, that, pathogenic bacteria can not irritate the tissues of the body so long as the resistance of the cells is normal, that is, so long as they are healthy. There may be an exception to this rule when the germs are exceptionally virulent, though this is rare. Virulent pathogenic bacteria are constantly present in the upper respiratory tract, though they are harmless until the resistance of the cells is lowered by some intracorporal or extraneous influence.

2. *Predisposing Causes.*—There are many predisposing causes of inflammatory diseases of the nose, some of which are best explained by grouping them around a well recognized physiopathologic law, namely, *When the drainage and aeration of a mucous membrane lined cavity is impaired or blocked, the conditions are favorable for the growth of pathogenic bacteria.*

If this is true, each case of inflammatory disease of the nose and accessory sinuses should be examined to ascertain if the drainage and aeration of these spaces are impaired or blocked. If they are, the obvious therapeutic duty is to remove the obstruction by such remedial measures as will best accomplish the purpose. These measures may be either medicinal, hygienic or surgical.

If, on the contrary, no obstructive lesion is found, other causes for the lowered resistance of the tissue should be sought for. If the inflammation is a primary acute one, and the lowered resistance is due to shock from exposure, it may be useless to attempt to remove the cause as it was transient. The immediate duty in such a case is to promote the reaction of inflammation and thus check the inflammatory process. As Adami so aptly says, the way to cure inflammation is to increase it.

In order to logically approach the consideration of the causes of the lowered resistance of the mucous membrane of the nose and accessory sinuses they should be divided into two groupes, namely:

- a. Extranasal b. Intranasal.

EXTRANASAL PREDISPOSING CAUSES.

Age seems to exert some influence upon the resistance of the nasal mucous membrane. Young children and young adults are more frequently subject to inflammatory diseases of the nose and accessory sinuses than those of more advanced years. This is, no doubt, due in part to indiscretion, as the improper care and protection of the body from the inclemencies of the weather. Persons of more mature years have more mature minds and better judgement, and they do not expose themselves needlessly, as in youth and childhood. Then, too, the tissues acquire a resistance, or immunity to the noxious irritations.

Sex, perhaps, exerts some influence on the occurrence of inflammatory processes. Males are more exposed and more reckless than females, hence they are more often affected by inflammatory diseases. They are more pugilistic and more often have broken noses and consequent nasal obstruction than females.

Climate undoubtedly influences the occurrence of inflammatory processes. In regions where there is much cold wet weather with sudden changes of temperature, and of hygroscopic conditions of the atmosphere, it is more difficult to protect the body, particularly the feet, from the shock incident to such exposures. The shock thus sustained by the vasomotor nervous system leads to a lowered resistance of the mucous membranes, especially of the nose and accessory sinuses, hence the growth of bacteria in these regions is favored.

Exposure, especially unusual or unequal exposure of the body to damp cold or other atmospheric and metallurgic conditions, weakens the resistance of the tissues. The exposure of the feet to damp and cold is a most fruitful source of rhinitis and inflammations elsewhere in the body. Draughts striking a single portion of the body are det-

amental to the resistance of the tissues much more than when the whole body is thus exposed. Within certain limitations the exposure of the whole body often has a tonic effect, as all the animal mechanisms of the body are equally and simultaneously stimulated. When partial exposure is experienced only a portion of the mechanism is stimulated and an imbalance of the functional activities results. That is, there is confusion and havoc in the cellular activities, the nasal expression of which is often some form of inflammation.

The *clothing* is an important factor in maintaining or lowering the resistance of the mucous membrane of the upper respiratory tract. Too much is as productive of evil as too little clothing. If too much is worn the skin is rendered sensitive to slight exposure, and if too little is worn the body is subjected to continual stress, and exhaustion of the vital forces results. Either condition prepares the soil for the growth of pathogenic bacteria in the respiratory passages. Perhaps the most vulnerable part of the body is the feet, through the soles of which course large blood vessels. Anyway cold wet feet is a common cause of acute rhinitis and sinusitis.

The proper selection of *underwear* is a much mooted question. Wool is advocated by some, while linen or linen mesh is strenuously recommended by others. In the meantime most persons buy cotton for summer and cotton and wool mixtures for winter wear; not because they believe they are the best, but because they are cheaper.

My ideas on the subject are as follows: Linen absorbs moisture better than either cotton or wool, and is, therefore, better for summer wear. Wool is warmer than either cotton or cotton and wool mixtures and is better for winter wear. Some persons perspire easily in winter and for them linen should be worn next to the skin. If this does not retain enough body heat light wool should be worn over the linen underwear. Cotton or cotton and wool mixtures are perhaps never preferable to wool and to linen and wool combinations for the winter months.

The outer garments should be medium weight for the winter months, the over garments being depended upon for extra protection for outdoor wear. If the indoor clothing is too heavy the skin becomes tender and subjects the wearer to shock upon undue exposure when out of doors. The underclothing and outer garments should, therefore, be selected for their absorptive and heat-retaining properties. Hard and fast rules cannot be laid down in reference to the clothing, each subject being a law unto himself. The aim should be to so regulate the clothing as to avoid either extreme, as to do otherwise subjects the system to shock, and thus

lowers the cellular resistance and prepares the soil for the growth of micro-organisms and inflammation.

The *digestive tract* is by some writers justly held responsible for inflammatory processes of the upper respiratory tract. If the processes of digestion and nutrition are imperfectly performed, noxious material enters the vascular and lymphatic circulation and thus places extra stress upon all the fixed and migrating cells of the body. Lowered resistance therefore naturally follows.

Certain *constitutional diseases* likewise produced a lowered resistance of the tissues, including the mucous membrane of the nose and accessory sinuses. Diabetes, syphilis and all diseases due to faulty metabolism especially affect the tissues of the respiratory tract and predisposes them to infection and inflammation.

Heredity probably has no direct influence in the predisposition to infectious and inflammatory diseases of the nose. Indirectly it may have such an influence. That is, certain anatomical conformations of the nasal chambers may be transmitted from parents to the child and thus lead to a predisposition to infection and inflammation.

Adenoids may interfere with the drainage and aeration of the nose and accessory sinuses, or inflammation focalized in them may lower the resistance of the mucous membrane of the nasal and accessory sinuses and thus predispose to infection and inflammation. These and other extranasal influences may prepare the soil for the growth of pathogenic bacteria in the nose and accessory sinuses and may eventuate in empyaema of the sinuses without obstructive lesions in the nose. Whatever the case of the lowered resistance of the mucous membrane the result is the same.

I do not wish to be understood as saying that infection and inflammation always follow a lowered resistance of the nasal mucous membrane. I only claim that a lowered resistance predisposes to such a process. The virulence of the micro-organisms present and perhaps other conditions enter into the equation.

INTRANASAL PREDISPOSING CAUSES.

In this connection I wish to repeat the physio-pathological law which largely explains the occurrence of infection and inflammation of the nose and accessory nasal sinuses, namely,

Cavities lined with mucous membrane are predisposed to inflammation when their drainage and aeration are obstructed.

From experience we know that when such obstructions are present and are removed either by local application or by surgical interference, relief often promptly follows.

Let us direct our attention, therefore, to some of the obstructive lesions of the nose which predispose the mucous membrane to infection and inflammation.

Obstruction of the Lower Portion of the Nose.—I desire first to call attention to a fact that has long impressed me as very important, namely, that obstructions in the lower portion of the nasal cavity have a different clinical significance from obstructions located higher in the nasal passages. I also wish to call attention to the clinical significance of anterior obstructions as contrasted with obstructions otherwise located.

Obstruction of the Inferior Portion of the Nose.—Obstruction of the inferior portion of the nasal passages causes an approximation or an impingement of the inferior turbinal against the septum, at least at certain points. The pressure may be either intermittent or constant. The question of greatest importance is, How does such an obstruction affect the drainage and aeration of the nose and sinuses? As most of the mucous membrane of the nose and sinuses is located above the inferior turbinal, it is obvious that aeration is but little affected by such an obstruction. The pathway of the inspiratory current is largely limited to the middle and superior meatuses of the nose, and, inasmuch as an obstruction located inferiorly does not materially occlude the inspiratory tract, there is comparatively little disturbance of function. Furthermore, the drainage of the secretions is not materially blocked. The usual obstructive lesion in this region is a spur or ridge on the septum. The ridge is rarely equally prominent along its entire length. On the contrary it presents one or two prominent spines or knuckles which approximate or impinge against the inferior turbinated body, thus leaving wide gaps through which the secretions may drain to the floor of the nose without marked impediment.

The practical deduction to be drawn from these facts is, that an obstruction in the lower portion of the nose does not markedly reduce the resistance of the mucous membrane, especially in the upper portion of the nasal chambers and in the accessory sinuses. It does, however, have some influence in this direction, and in a degree predisposes to infection and inflammation. The crests of the spines or knuckles may accumulate secretions, which become dessicated in the form of moist or dry crusts. The tissue cells beneath the crusts are injured, and their resistance lowered, and to this extent there is a predisposition to infection and inflammation. Furthermore, the impingement of the spur or spine against the outer wall of the nose causes traumatic injury and

results in some degree of lowered resistance which may lead to bacterial infection and inflammation. The irritation is not usually pronounced and only causes an increased hyperaemia and nutrition of the tissues.

Obstructive lesions in the lower portion of the nose, therefore, may cause a turgescence of the mucous membrane, which is richly supplied with erectile tissue (the swell bodies), which, after a more or less prolonged period, may result in hypertrophy. In the early or turgescient stage the condition is called turgescient rhinitis; in the latter stage, it is called hypertrophic rhinitis. If, however, repeater infection occurs, the irritation is of a different type and causes hyperplastic changes.

Unfortunately, however, a deviation of the lower portion of the septum is usually accompanied by a deviation of the upper portion of nose in the region of the middle turbinal. When this is the case the type of inflammation is radically different from that present in an uncomplicated lower deviation. That is, a deviation in the region of the middle turbinal often obstructs the drainage and aeration of the superior meatus, and of all, or nearly all, of the nasal accessory sinuses. The secretions are retained, undergo decomposition, liberate a ferment and irritate the mucous membrane. In brief, the inflammation is attended by the proliferation of the least differentiated of the fixed cells or connective tissue cells. In other words, hyperplasia of the mucous membrane occurs. This is known as hyperplastic rhinitis. The irritation from the middle turbinal region may extend by continuity of tissue to the inferior turbinal and cause hyperplasia of this structure as well. Hence, hyperplastic rhinitis often involves both turbinated bodies. In simple deviations, however, limited to the lower portion of the nasal chambers, the inflammation is usually of the hypertrophic type.

Obstruction of the Anterior Portion of the Nose.—Deviation of the anterior portion of the septum from traumatism is a common cause of obstruction of the anterior portion of the nasal chamber. The relationship it bears to inflammatory processes of the nose and accessory sinuses is interesting and instructive. An anterior deviation does not interfere with the drainage of the secretions except in so far as it may affect the mechanical force of the respiratory currents of air. The mechanical force of the inspired air is especially manifested in the region of the infundibulum and posterior ethmoidal cells where the inspiratory current sweeps over the hiatus semilunaris and the ostia of the posterior ethmoidal calls and causes

slight rarefaction of the air within the sinuses drained by these openings. The mechanical impact facilitates the flow of secretions from the ostia and hiatus semilunaris and thus prevents desiccation and blockage of these openings. To this extent obstructive anterior deviations of the septum interfere with drainage.

The aeration upon the obstructed side is, however, very materially affected. The slight interference with the flow of the secretions caused by the absence of the mechanical impact of air results in a moderate retention of secretions. Decomposition of the secretions may therefore take place and cause a lowered resistance of the mucous membrane and thus establish a predisposition to infection and inflammation.

When the ridge or spur in the lower portion of the nose extends well forward into the vestibule, it also interferes with the aeration drainage is described in the preceding paragraph.

When either type of anterior obstructive deviation is present, another and more important etiological factor must be taken into consideration, namely, the rarefaction of air posterior to the obstruction. Air being unable to enter the nostrils rapidly enough during the descent of the diaphragm is rarefied, or a state of negative air pressure is established. This, according to Bier's theory, should prevent serious inflammatory processes, as the negative air pressure thus produced promotes the reaction of inflammation and thus prevents serious inflammatory disease. Doubtless the negative pressure thus automatically produced does exert a favorable influence upon the inflammatory process excited by the lack of aeration and the slight retention of the secretions. Thus, strange as it may seem, the anterior obstructive lesion predisposes to infection and inflammation and at the same time tends to cure it.

Clinically, I have often noted the comparatively slight inflammatory disease of the nasal mucous membrane present in simple anterior deviations.

The chief departure from the normal is a turgescence or a hypertrophy of the inferior turbinal. Little pathologic change is present in the middle turbinal region unless there is an associated obstruction in that location. The negative air pressure easily accounts for the turgescence of the erectile tissue of the inferior turbinates. After a prolonged duration of the turgescence, whether intermittent, alternating or constant, hypertrophy occurs as a result of the increased nutrition.

Obstruction of the Middle Turbinal Region.—Obstruction in this portion of the nasal chambers is productive of more serious

inflammatory disease of the nose and accessory sinuses than obstruction in any other portion of the nose. This is apparent when we recall the fact that the ostia of the posterior ethmoidal and sphenoidal sinuses open into the superior meatus above the middle turbinal, while the frontal, anterior ethmoidal and maxillary sinuses drain into the middle meatus beneath the middle turbinal.

If the septum is deviated so as to press against, or approximate near to, the middle turbinal, the olfactory fissure is blocked and the drainage of the posterior ethmoidal and possibly of the sphenoidal cells is interfered with.

Clinically I have noted the presence of two types of deviations of the septum that close, or nearly close, the olfactory fissure. One is a bowing of the perpendicular plate of the ethmoid bone and triangular cartilage, and the other is a thickening of the septum in the region of the middle turbinated body. The bowed septum is thin and easily corrected by the submucous resection of the septum, whereas the thickened septum often involves only the mucous membrane and is more difficult to correct.

In some subjects there are large pneumatic spaces in the middle turbinal which may either close a part or all of the olfactory fissure, or they may encroach upon the hiatus semilunaris beneath it. In the first instance the drainage and aeration of the superior meatus of the nose, and in the second instance the drainage and aeration of the frontal, anterior ethmoidal and maxillary sinuses is impaired.

A large bulla ethmoidalis projecting medianward and downward may obstruct the hiatus semilunaris, and thus obstruct the drainage and aeration of the cells draining into the infundibulum, namely, the frontal, anterior ethmoidal and maxillary sinuses.

Likewise the occasional pressure of cells in the inner wall of the infundibulum or uncinate process of the ethmoidal bone may block the infundibulum and cause serious inflammatory disease of the frontal and anterior ethmoidal cells and the maxillary antrum.

In about 50 per cent. of cases the fronto-nasal canal does not communicate with the infundibulum, but opens directly into the middle meatus more anteriorly. In these subjects an enlarged projecting bulla ethmoidalis and cells in the uncinate process would not block the drainage and aeration of the cells draining through the fronto-nasal canal, namely, the frontal and anterior ethmoidal cells. The ostium of the antrum, however, may be obstructed, as it usually opens into the infundibulum.

THE RESULTS OF HIGH OBSTRUCTIONS.

In the Nose.—When the olfactory fissure is obstructed by either septal or turbinal deformity, the drainage of the secretions and the aeration of the posterior ethmoidal and sphenoidal sinuses is impaired. The secretions are retained and undergo retrograde changes. The mucous membrane is bathed in the secretions and becomes impaired and its functional activity and its resistance is lowered. The biochemical substances liberated in the process of decomposition constantly irritate the mucous membrane, especially of the middle turbinated body. Acute infection occasionally occurs. During the intervals between the acute inflammatory processes a mild staphylococcal or other infectious inflammation persists. Under these conditions there is a proliferation of fixed cells in the tissues, usually the least differentiated of the fixed cells, viz.: connective tissue cells.

The results of these influences in the nose is known as Hyperplastic Rhinitis, which chiefly involves the middle turbinated body, though it often extends to the inferior turbinal as well.

In the Posterior Ethmoidal and Sphenoidal Cells.—The partial or complete closure of the olfactory fissure, and the consequent retention of the secretions of the superior meatus, and the ethmoidal and sphenoidal sinuses draining into it, cause hyperplastic changes in the mucous membrane, not alone of the middle turbinal, but of the superior meatus and of the accessory sinuses opening into it. The conditions thus produced are favorable for infection and inflammation. The inflammatory process may be either catarrhal, purulent, fibrinous, phlegmonous or suppurative in type, and in each instance it is in part due to pathogenic micro-organisms.

The sinusitis thus excited may continue for years without engaging the attention of either the patient or physician. Headache and slight dizziness, aggravated upon stooping, may be the only symptoms complained of, except, possibly, recurrent attacks of acute coryza. Or the sinusitis may be distinctly and frankly purulent with copious discharge into the epipharynx, and possibly to some extent through the olfactory fissure.

Atrophic rhinitis with ozena is, in my opinion, in adults, often a suppurative sinusitis with atrophy of the mucous membrane. Space does not permit of a full discussion of this phase of the subject. Personally I have repeatedly overcome the ozenic secretion by treating the case as though it were a suppurative sinusitis. I have made skiagraphs of several cases of atrophic rhinitis with ozena, and without exception they have shown the existence of sinus

disease. This does not, of course, determine which was primary, the atrophic rhinitis or the sinuitis. My opinion is largely based upon the results following the treatment for the sinuitis.

Obstruction Due to the Bulla Ethmoidalis, Cells in the Middle Turbinal and Uncinate Process.—As previously stated, a large bulla ethmoidalis may occlude the infundibulum and thus block the drainage and aeration of the maxillary, frontal and anterior ethmoidal cells. This, as heretofore explained, causes the retention of the secretions and lowered resistance of the tissue, thus establishing a predisposition to infection and inflammation.

Cells in the middle turbinated body and uncinate process likewise may block the infundibulum and cause similar results. The exceptions have been referred to wherein the fronto-nasal canal opens directly into the middle meatus anterior to the infundibulum.

It appears, therefore, that there are several factors entering into the causation of inflammatory diseases of the nose and accessory sinuses. The exciting cause is nearly always pathogenic microorganisms, while the predisposing causes are numerous extranasal influences which are often combined with obstructive lesions in the nose. The latter should always be studied with reference to whether they interfere with the drainage and aeration of the nose and accessory sinuses. If only extranasal causes of lowered resistance are found, the treatment should be addressed to their removal; and if, in addition to the extranasal influences, obstructive lesions are found, they should be corrected by probing or by surgical interference.

CONCLUSIONS.

1. Acute inflammation is usually a threefold reaction excited by pathogenic bacteria and their toxins, namely:

- (a) Increased passive hyperemia.
- (b) Increased nutrition of the tissues.
- (c) Increased migration of leukocytes.

The reaction of acute inflammation is the response of Nature's forces for the purpose of destroying the bacteria and their toxins.

2. The reaction of inflammation is usually inadequate to quickly remove the infective bacteria and their toxins, hence the inflammation is continued for several days, or it may be indefinitely prolonged.

3. Chronic inflammation consists of the same reactions in much less degree, and is still further characterized by the proliferation of fixed cells into the tissues, notably connective tissue cells.

4. The exciting cause of inflammation is generally some pathogenic micro-organism.

5. Pathogenic bacteria do not *per se* cause inflammation, There must be a lowered resistance of the tissues before they will rapidly multiply and produce inflammation.

6. Anything that lowers the vitality or resistance of the mucous membrane of the nose and accessory sinuses predisposes it to infection and inflammation.

7. The extranasal influences that lower the vitality of the mucous membrane are: Sex, climate, exposure, improper clothing, digestive disorders, constitutional diseases and dyscrasia, hereditary anatomical peculiarities of the framework of the nose, adenoids, etc., etc.

8. The intranasal predisposing causes of inflammation of the mucous membrane of the nose and accessory sinuses are, perhaps, best explained by the well-recognized law that *Obstruction of the drainage and aeration of mucous-lined cavities predisposes them to infection and inflammation.*

The character of the inflammation and the end result is partially determined by the location of the obstruction in reference to the various tissues of the nose and to the accessory sinuses.

9. Anterior and inferior obstructions more often cause turgent and hypertrophic rhinitis, as they do not materially interfere with the drainage of the secretions and therefore cause very little or no irritation.

10. Obstruction higher in the nose, in the region of the middle turbinal and the infundibulum causes the retention of the secretions and interferes with the aeration of the superior meatus and the accessory sinuses, thus lowering the resistance of the tissues, and establishing a marked predisposition to infection and inflammation of the nasal and accessory sinuses. The inflammation may be catarrhal or suppurative and acute or chronic in type.

11. The long-continued mild irritation excited by obstructive lesions in the middle turbinal region often results in hyperplastic rhinitis, which may be limited to the middle turbinal, though it may extend to the inferior turbinal.

12. Inflammation also extends to adjacent parts by the continuity of tissue, hence it may extend from one part of the nasal mucous membrane to another, or it may extend from the nasal mucous membrane to the sinuses.

PATHOLOGIC CONDITIONS OF THE NASO-PHARYNX IN THE ADULT.*

BY EDWIN PYNCHON, M. D., CHICAGO.

Ever since the publication of the memorable paper by Hans Wilhelm Meyer, in which he announced the pathologic importance of adenoid growths in the naso-pharynx, attention has been directed to this field, and during succeeding years there has been manifested a progressive appreciation of the value of the discovery and of the importance of removing these obstructive growths which, if allowed to remain, are so likely to induce the development of either otitic or systemic disturbance which may so seriously impair the vitality of the patient or so unfavorably influence his future welfare in so many ways.

The posterior rhinoscopic examination is often quite unsatisfactory, even in a patient with a tolerant throat, owing to the smallness of the opening leading to the naso-pharynx when the soft palate is fully relaxed. The uvula is also at times broad or enlarged so that a view must be taken from either side thereof. In such cases a very small rhinoscopic mirror, even a No. 00, may be required, though of course the smaller the mirror used the less light is reflected, and the smaller the field exposed, hence a complete view is obtained only by successively examining the several points of interest. By using as large a mirror as the patient will tolerate, the illumination is proportionately intensified.

The angle at which the mirror is bent upon the handle is also a point to be considered and the more abrupt it is, up to nearly a right angle, the better the view obtained of the lower portions of the choanae, while in order to see the vault to the best advantage an angle more extended serves to a much better purpose. In order to fill the varying requirements, a tilting mirror, the angle of which can be regulated by a spring thumb lever, is almost a necessity. I use one of the Michels pattern. The patient should be directed to close the eyes and breathe steadily through the nose while the tongue is pressed firmly downward with a tongue depressor. Sometimes this can better be done by the patient in order to avoid gagging.

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For several years I have been employing a procedure whereby a better view can be secured in certain cases, wherein the anatomical formation permits, and in which the examination as usually made is unsatisfactory, owing to the narrow opening above alluded to. I direct the patient to turn on the chair to the extent of 90 degrees so one shoulder will be turned toward me, when, without changing the position of the body, the head only is rotated frontward to the maximum degree as I make the examination. By the tortion thus secured, the naso-pharyngeal opening is changed from an oval to triangular shape with the base thereof at the rear, and into this widened base I so place the mirror as to obtain an excellent view

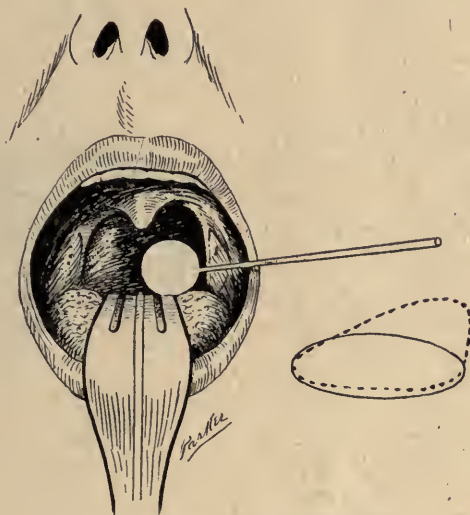


Fig. A. Lateral Posterior Rhinoscopy.

of the opposite half or the naso-pharynx. By reversing the position of the patient, the other side can in like manner be examined. In this way, I can often use a larger mirror than would be tolerated when the usual method is practiced. Furthermore, as the mirror is also further away from the point of observation, a larger field can be seen. This procedure is well illustrated in Fig. A. While employing this method, a soft palate retractor is never required.

In order to obtain a better view, when the examination is being made from the front in the usual manner, it is not infrequently desirable to use some form of soft palate retractor. Latterly I have been using my compressed air aspirator, as shown in Fig. B, which

is of particular value when the uvula is enlarged. During this procedure the patient must handle the tongue depressor.

At times, however, there are cases encountered wherein gentle means are of no avail, when I employ a method which I formerly described in a paper entitled "Pharyngeal Adenoids" which was published over seven years ago.¹ The introduction of a small rubber tube through one nostril and then out of the mouth and, after sufficient stretch is given, the tying of the two ends in a bow knot over the upper lip has been frequently shown and by different writers. I have never been able to obtain any satisfaction from

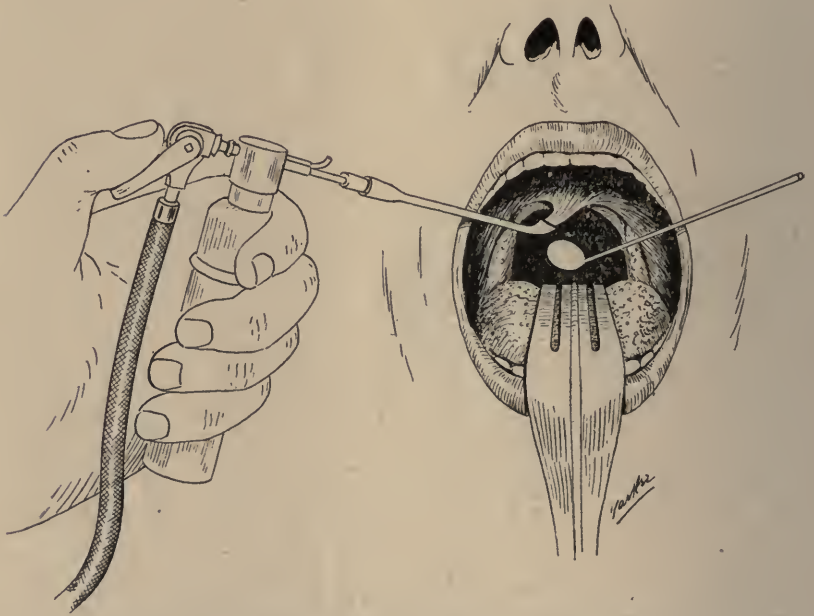


Fig. B. Pulling Uvula Forward with Compressed Air Aspirator.

this method for different reasons: *First.* The rubber tube, owing to its size, occludes the inferior meatus in one nostril so as to preclude a simultaneous anterior examination of that nostril. *Second.* The bow knot is highly unsatisfactory, as it slips and furthermore soon becomes foul and slimy from either blood or nasal secretions. *Third.* The soft palate is so stretched as to make a narrow triangular slit anteriorly, which is not an ideal form to give the best results. *Fourth.* It is excessively disagreeable to the patient who can neither expectorate nor swallow, and the only way to give him

a rest or relief is by complete removal of the tube. With these important and numerous objections it seems strange that different authors for so many years have continued to copy its description from predecessors.

My method is clearly illustrated in Fig. C, and requires the use of a solid elastic cord 5-32 of an inch in diameter, and about two feet in length. These cords, of different sizes, are employed by the general surgeon as ligatures. I find the next larger size (3-16 inch) is too large and clumsy, while the next smaller size ($\frac{1}{8}$ inch) stretches out too fine so as to be painful when sufficient tension is



Fig. C. Use of Elastic Cord as Soft Palate Retractor.

employed. After suitable cleansing, and while still wet, one end of this cord is passed along the floor of one nostril until it can be seen back of the soft palate, the patient meantime holding down his own tongue, when it is grasped with a forceps and drawn out of the mouth on the same side. Next, the opposite end of the cord is passed in a similar manner through the other nostril and out from the mouth on that side so the middle of the cord rests close to the upper lip and against the nasal partition. Lastly, sufficient tension is given either end so that the soft palate is drawn well forward, when the ends are passed backward from either angle of

the mouth and crossed at the back of the neck, where they are securely locked by a strong scissors artery forceps.

When the cord is thus applied the nose can be easily blown and cleansed and the mouth can be tightly closed. Even though spasmodic action of the soft palate is induced, it will soon subside under the elastic pressure owing to the much greater length of cord employed than by the antique method previously alluded to. As one end is drawn to either side of the mouth the anterior edge of the naso-pharyngeal opening instead of being V-shaped is shaped more like a U with a flattened bottom, which gives far more room for either examination or operation. Furthermore, when the soft



Fig. 1. Tongue Depressor with Saliva Ejector. ($\frac{1}{4}$ size.)

palate tires from the tension, or when the patient desires to swallow, all tension can for the nonce be removed by the patient simply pulling forward upon the cord when grasped over the cheek by a band on either side. As soon as this hold is released, the elasticity of the cord is again operative and the soft palate is held forward as before. This interruption can to a large extent be avoided by the use of a dental saliva ejector or other aspiration device. Personally, I prefer my tongue depressor with saliva ejector attached (Fig. 1). Lastly, while in position with the stretched cord in either nostril so slight a portion of the area of the opening is encroached upon that an anterior examination with a nasal speculum

can be made at any time. As described this method of retracting the soft palate is of inestimable value during major operative procedures in the naso-pharynx.

The adenoid growth or enlarged pharyngeal tonsil, when not removed, passes through much the same atrophic evolution as does the faucial tonsil in its change from hypertrophy to submersion. In its destruction by nature's process, there follows a sort of flattening out whereby the normal concavity of the vault of the pharynx is so filled that it presents a flattened or plane surface instead of the normal curve, which should be easily recognized by posterior rhinoscopic examination, though, as there remains no protrusion, the flattened surface may be regarded as normal by the examiner unless his attention has been particularly directed thereto. By this examination, the mucous membrane of the naso-pharynx will generally be found to be more red than normal, and not infrequently there will be resting upon this flattened surface some visible inspissated secretion. The patient usually reports the presence of a post-nasal catarrh.

With the mirror in proper position, if the examiner will pass through either nostril near the floor a delicate applicator, the end of which is tightly wrapped with a small tuft of cotton, he will find that the cotton-wrapped end of the applicator can be easily made to enter to the extent of about one-fourth inch into the soft tissue which causes the vault of the naso-pharynx to be flat as described. While the pathologic tissue alluded to may not be as much as one-fourth inch in depth, the applicator will enter to this extent, as it is inserted at an angle to the surface thereof. In this way, the diagnosis can be easily confirmed. In certain cases wherein this condition is present, there will be observed one or two vertical slits which have been named pharyngeal bursae or Luschka's crypts. It seems to be a self-evident proposition that these bursae or crypts can only exist when there is present the degenerate adenoid, and that no such depressions can ever be found in or upon the normal smooth mucous membrane covering the vault. These bursae, when present, serve like the tonsillar lacunae as a resting place or exit for mal-secretions.

In our standard text-books, but rare and brief allusions to the fossae of Rosenmueller are to be found, at least as regards any pathologic import they may have. Attention is called to synechiae or web-like strings reaching across from the tubal prominence to the pharynx, and, as when they exist, they retain secretions, and

have an uncanny look, it is suggested that they be destroyed. At the meeting of this society last year a paper was presented by Dr. Thos. L. Brunk² in which he gave the results of his investigation of these fossae and reported favorable results obtained in many cases by a thorough curettement thereof when abnormally shallow; that is, when not possessing their normal depression, owing to a deposit of soft granular tissue, which is easily removed by the finger nail. During the operation the patient generally experiences a crackling sensation and hears the breaking down of the spongy tissue. This condition of the fossae is often observed in patients who complain of stuffiness of the ears, impaired hearing, tinnitus, and hoarseness.

The purpose of this paper is to call particular attention to these two locations which are so often a resting point for soft or friable deposits of degenerate tissue, the pathologic nature of which is clearly proven by the prompt cessation of unfavorable symptoms after its destruction. Other abnormal conditions of the naso-pharynx will be cited, though their correction is fully indorsed by all authorities.

Pharyngitis hypertrophica lateralis is a condition quite often observed, in which an enlarged band at either side of the pharynx just back of the posterior pillars is present and may extend upward considerably beyond the point of attachment of the soft palate. The mucous membrane covering thereof is generally more red than normal and both wrinkles and bulges forward when the patient gags. Their irritated condition is frequently proven by the patient acknowledging discomfort when they are touched by a probe. Granular pharyngitis is considered in all text-books. In the writer's experience it is more symptomatic than real, and is always due to other troubles which, when corrected, usually cause a fading away of these granules. Hence no special treatment thereof is required.

The anterior boundary of the naso-pharynx consists of the choanae with the intervening septum and the posterior ends of the turbinates upon their outer borders. In order that the respiratory functions of the nose may not be interfered with, these choanae should possess certain features which are required in the normal nasal passages. No hypertrophied condition of the parts should be present whereby drainage or breathing are obstructed, or whereby the course of the passing air current is deviated from its path. When these desired features of structural formation obtain, the

mucous membrane is of the normal pink color, and no retained secretions are visible; furthermore, no two opposing surfaces touch each other.

One form of hypertrophy not infrequently observed is a pale bulging on one or both sides of the vomer near its posterior end and opposite the posterior end of the opposing middle turbinal. These growths are chiefly detrimental through their deviating the course of the air current, which has been thought by one writer to be a common cause of tubal catarrh, as the incoming air current is thereby caromed against the Eustachian prominences so as to be both irritating and drying. Aside from such deviation of the air current, these growths, by diminishing the area of the choanae, serve like any other obstruction at this point as a producer of alternate rarefaction and condensation of the air in the post-nasal space, and are thus harmful.

Enlargement of the posterior end of the middle or inferior turbinals is another condition quite often observed, and, while such enlargement may be acute and hyperaemic, it is more often a true hypertrophy having at times the appearance of polypoid degeneration, and, like similar conditions of the soft parts in the nasal passages, yields a more or less excessive and often tenacious secretion which generally passes for post-nasal catarrh.

Lastly, the choanae are at times obstructed by nasal polypi, usually myxomatous, though occasionally there is found instead a so-called fibrous polypus. In fact, fibroma may grow from most any point in the post-nasal vault. In this paper these two latter conditions will not be considered.

Any obstruction of the choanae has an unfavorable effect upon the voice, and requires the vocalist to make a greater effort in order to attain the desired note. Such increased effort, or straining of the voice, is an undoubted factor in the production of those laryngeal troubles so often found in the vocalist.³

The operative procedures required in order to correct the several conditions enumerated are comparatively simple for one familiar with rhino-laryngologic manipulations.

The hypertrophied lateral bands of the pharynx are best destroyed by parallel linear incisions made with the galvano-cautery point, which is painless with local anaesthesia. During the operation it is desirable that a soft palate retractor be employed, the patient meantime holding his tongue down firmly with a tongue depressor. By having a rhinoscopic mirror in position, the oper-

ator can easily locate and guide the cautery when above the velum. For patent reasons the incisions are best made from above downward.

For removing the soft and degenerate adenoid tissue in the vault, the ordinary adenoid curettes are not suitable. I have for some time been using a special curette with double cutting edge, whereby the vault can be easily cleared. During its use it is better to retract the soft palate while the patient holds down his tongue with a depressor. Under local anaesthesia no particular pain is complained of, and, as this is a condition peculiar to adults,



Fig. 2. Naso-Pharyngeal Curette. (2.5 size.)

a general anaesthetic is never required. In order to anaesthetize the field I pass a cotton-wrapped applicator through either nostril so the cocaine rests against the tissue to be operated, for about ten minutes. Lastly, just before operating, I make a further application of the anaesthetic, usually a 10 per cent. solution, by use of a post-nasal applicator. I might here add that each of my different per cent. solutions of cocaine contain one-half as much phenol as there is of the cocaine, which seems to intensify the anaesthetic effect and tends to also diminish systemic intoxication. Furthermore, the solutions so made will keep indefinitely, and the antiseptic quality of the phenol is of undoubted advantage.

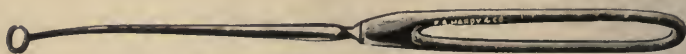


Fig. 3. Modified Meyer's Ring Curette. (2.5 size.)

For many years I have had in my outfit a Meyer's ring curette of the original pattern, which is straight and has only one cutting edge. Some time ago I had the previously dull back made sharp and the end given a slight bend. With this instrument passed through the nose, these described growths could be easily removed, though I have not put it to use, as the previously described curette has always seemed to be the preferable instrument. In a patient with roomy nostrils and an extremely sensitive throat, this

latter described modified Meyer's curette might prove to be the instrument of selection.

For curetting the fossae of Rosenmueller, I have found no instrument to be the equal of the finger nail. In operating the patient's right side, I use my right index finger, and for the patient's left side the index finger of the corresponding hand. While operating, the cheek of the patient is pressed between the teeth with the operator's middle finger, as the head is firmly held with the opposite arm, the same as when introducing the finger into a child's post-nasal space for diagnostic purpose. In this way, my method differs somewhat from the plan followed by Dr. Brunk. After cocaine anaesthesia, I have found that the patient rarely regards the procedure as being particularly annoying. Following the curettement, the wounds should be gently massaged a few times with a 40-grain solution of argentum nitras.



Fig. 4. Nasal Cautery Electrode. (Full size.)

For the destruction of soft posterior hypertrophies, either side of the vomer, the galvano-cautery is all-sufficient. After anaesthesia, the cautery electrode (Fig. 4) is passed through the anterior naris of one side, and its point is properly located by use of the posterior rhinoscopic mirror. The proper distance to enter the electrode can be roughly ascertained by first introducing a cotton-wrapped applicator to the hypertrophied point as seen by the post-rhinol mirror, then, by grasping the applicator even with the tip of the nose, the distance back therefrom to the hypertrophy can be measured, when, by laying the applicator upon the electrode, the approximate point which should be even with the tip of the nose can be noted, or even marked by the placing of a small elastic band upon the shaft of the electrode, which is introduced, tip down, and then, when far enough in, is rotated up against the hypertrophy. Generally two short parallel linear incisions are required.

For operating upon the posterior hypertrophied tips of the turbinals, either the same cautery point may be employed, or, still better, the hot snare, if the loop can be made to engage the bulging end. For an anaesthetic, some one of the substitutes for cocaine, as alypin, had better be selected, as cocaine often causes too much contraction of the point to be operated upon, so that it will not so readily engage the snare. The distance the snare should be entered can be ascertained, as before described, by the use of the measuring cotton applicator. As the snare loop is much more bulky than the cautery point, therefore causing retching, it must be employed without the help of the post-nasal view. By having a slight bend in the canula, the loop can generally be coaxed to engage. A hot snare takes a quicker hold without slipping than does the cold snare, and additionally gives the advantage of both cautery destruction and contraction. Furthermore, the danger of hemorrhage is reduced to a minimum.



Fig. 5. Tubular Shears. ($\frac{1}{2}$ size.)

While I have employed the hot snare in the manner outlined upon many occasions without unfavorable results, there have been reported cases wherein an otitis media has followed the use of the cautery in this region. Hence, a preference is expressed by some for the cold snare, while others advise a cutting operation. Never having found a cutting instrument for this purpose which gave promise of efficiency, I have recently had constructed by F. A. Hardy & Co., of Chicago, a tubular shears which I think will fill the several requirements. By its use a considerable portion of a posterior turbinal hypertrophy can be amputated. In fact, it can also be employed while operating upon the depending portion of the anterior hypertrophy of an inferior turbinal. When used in operating a posterior hypertrophy, its proper position can be secured by having a finger in the post-nasal space. When more than one post-nasal operation is required, it is wiser to allow a few days to intervene between the succeeding attacks.

After the removal of all pathologic tissue in the naso-pharynx, as described, the mucous membrane lining thereof will soon assume the normal pink color of health unless there are remaining pathologic conditions of either the nasal passages or the faucial tonsils, either or both of which will contribute toward keeping up an irritated condition of the naso-pharyngeal mucous membrane. Good results are invariably obtained by operating upon any or all of these conditions alluded to, when found. I have been much impressed with the great benefit derived from curettement of the fossae of Rosenmueller when filled with soft tissue as described. In several cases there has promptly ceased a sensation of fullness of the ears as complained of by the patient. Tinnitus has in several cases been improved or eventually cured, and in one case within twenty-four hours, with no recurrence to date, the operation having been done over six months ago. Equally favorable results have followed curettement of degenerate adenoid tissue, particularly in the way of correcting unfavorable otitic manifestations, while asthma has been as promptly relieved by the hot snare removal of posterior turbinal hypertrophies.

103 State Street.

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TWO CASES OF EXTENSIVE CHOLESTERIN INFILTRATION OF THE MASTOID CELLS.*

BY EDWARD BRADFORD DENCH, M. D., NEW YORK.

Cholesteatomatous deposits within the middle ear, as the result of a chronic suppurative inflammation, are by no means uncommon. In almost every case of chronic suppuration, in which a radical operation is performed, cholesteatomatous masses, varying widely in size, are found in the tympanic vault. Exceptionally, these cholesteatomatous masses involve not only the tympanic vault, but to a greater or less extent, the entire mastoid apophysis. Under these conditions, the cholesteatoma consists of a mass of superimposed epithelial cells forming a tumor which, by its gradual increase in size, has caused the absorption of the bony trabeculae separating the mastoid cells, until the entire mastoid process is converted into one large cavity. In this epithelial mass we find a certain amount of cholesterol. In the cases which I am about to report, however, the true cholesteatomatous tumor was insignificant in size. But in each instance, all of the mastoid cells were infiltrated with cholesterol.

The *first case* was that of a young woman, 17 years of age, who had had a suppurative otitis upon the right side for twelve years. At no time had the suppuration been very profuse. The patient had been under the observation of a competent otologist, who had contented himself with keeping the ear thoroughly cleansed, and as the patient had had no acute symptoms, operative interference did not seem imperative. As the discharge continued, however, at intervals, he finally referred the case to me.

The patient gave a history of having had occasional attacks of vertigo and recurrent attacks of discharge from the right ear at intervals. There was a history of some mastoid tenderness. When I saw the patient, the temperature was normal, there was no pain in the ear, although pressure over the mastoid elicited considerable tenderness. The patient was somewhat nervous, and it should be stated that pressure over the opposite mastoid was also painful.

In view of the history of this case, a radical operation was performed, and a small cholesteatomatous mass was found in the mas-

* Read before the Annual Meeting of the Middle Section of the American Laryngological, Rhinological and Otological Society, held at Cleveland, February 22, 1907.

toid antrum. The mastoid cells throughout were deeply congested. The cells below the antrum, down to the very tip, presented a peculiar appearance. Instead of the glistening lining characteristic of the healthy mastoid cells, the lining membrane of these cells, wherever exposed, was dull in color, and the bone when removed either with the gouge or rongeur, did not present the characteristics of healthy bone. I can compare the texture of this bone to nothing but that which might be found if the normal mastoid cells were filled with wax. In the course of the operation, it was necessary to ablate the entire mastoid process.

From the appearance of the bone, I was inclined to believe that the process was a tubercular one, and consequently, sent several specimens to the laboratory for examination. The pathologist's report showed an infiltration of all the mastoid cells with cholesterolin, even the cells at the tip being involved. The pathological findings throughout were peculiar, in that cholesterolin was found everywhere, but very few germs were found in any part of the mastoid. The condition was one entirely new to me. I have had no opportunity to search the literature upon this subject, but do not remember reading of a similar case.

It seems to me quite possible that a cholesterolin infiltration of this character might explain the rapid breaking down of the mastoid process in many cases of chronic suppurative otitis media, which have remained quiescent for a long period, and it is for this reason that the history is reported so fully.

In this instance, the patient made a rapid and uninterrupted recovery after the radical operation.

In a *second case*, occurring in a young woman of 26 years of age, practically the same condition was found. In this case, the otitis media came on after typhoid fever, and had existed for three years prior to operation. There was a history of recurrent attacks of acute suppuration during this period. None of these attacks, however, had been severe. At the time of operation—which was performed on account of the history of recurrent suppurative attacks—the same condition, as detailed in the preceding case, was found, namely, cholesterolin infiltration of all of the mastoid cells, with a not very extensive cholesteatomatous mass in the mastoid antrum.

This case also made an interrupted recovery after the radical operation.

These cases are reported in detail, because, so far as I know, attention has not been called to this condition in otological literature.

In operating upon cases of this character, the question naturally arises whether it is necessary to ablate the entire pneumatic structure of the mastoid, where this condition exists. It has ordinarily been my practice, in performing the radical operation for chronic suppuration, to limit the operation to that part of the mastoid which showed gross evidences of disease. While in the majority of cases where the radical operation was performed, as the lower mastoid cells were usually either absent or were very small, it has never been my practice where these cells have appeared healthy, to ablate the entire mastoid. As soon as normal cell structure was reached, I have concluded my operation, and the results have always been satisfactory. In the two cases under consideration, however, the cholesterolin infiltration of these cells seemed to constitute a peculiar factor, sufficient to warrant the complete ablation of the mastoid. It is possible that these cases might have recovered if the antrum and adjacent cells alone had been cleared out and the radical operation performed in the usual manner, without removal of the mastoid tip, even although this part of the mastoid contained cholesterolin. Personally, I should be unwilling to terminate the operation at this point, and I believe that the condition described may constitute a factor in cases where suppuration persists after an apparently complete radical operation.

All of us who have performed many radical operations know that this procedure is not uniformly successful in causing a complete cessation of suppuration. In the majority of cases where slight suppuration persists after the operation, that portion of the middle ear about the tympanic orifice of the Eustachian tube is at fault. While this condition is annoying, I do not consider it dangerous. There are certain other cases, however, in which although no diseased bone can be detected in the cavity left by the radical operation, slight suppuration continues. It is a question in my mind whether, in some instances, certain cells containing cholesterolin deposits have not been overlooked.

I believe it wise, therefore, in every instance where the slightest doubt is present in the mind of the operator, as to the fact of the lower portion of the mastoid being normal, to give the patient the benefit of the doubt, and to ablate completely the entire mastoid process so as to eliminate every possible focus of disease. In

the cases detailed above, although the operation was very extensive, recovery was exceedingly rapid. One case was practically dry at the end of three weeks, this case being one where primary grafting was employed, and the other case was well at the end of about five or six weeks. In this latter case, owing to the necessary extensive exposure of the lateral sinus, primary grafting was out of the question, and at a secondary grafting, performed on the fourth day after the operation, it seemed advisable to introduce only a meatal graft just sufficient to cover the margins of the enlarged meatus. In spite of the extensive operation, however, recovery was exceedingly rapid.

From an increasing experience, it seems to me that the more radical we are in these radical operations, the quicker the patients recover.

17 West 46th Street.

The Anatomy of the Lymphatic Vessels of the Middle and External Ear. A. MOST. *Archiv f. Ohrenheilk.*, April-May 1905.

The capillary lymphatics of the ear form a continuous network of vessels, extending from the auricle through the drum-membrane and middle ear and the Eustachian tube, and continuous with the lymphatics of the pharynx. The lymphatics from the anterior and upper walls of the canal and the tragus empty into the preauricular glands, situated between the canal wall and the parotid gland. The lymphatics from the floor of the canal, from the lobule and lower part of the auricle empty into the infra-auricular glands, between the parotid and sterno-mastoid. From the greater part of the auricle they empty into the post-auricular glands, and from the posterior canal wall into the deep cervical glands. The latter, situated close to the internal jugular vein, also receive branches from all the above named glands. The lymphatics from the tube empty into the lateral retropharyngeal glands. These glands are the seat of retropharyngeal abscess in children. They disappear during adolescence, when the lymphatics pass directly to the deep cervical glands. The lymphatics of the tympanum could not be demonstrated anatomically. From the drum membrane they empty into the infra-auricular glands, and from the tympanic cavity itself, at any rate in children, they probably drain into the lateral retropharyngeal glands, and then into the deep cervical glands.

YANKAUER.

SARCOMA OF TONSIL TREATED WITH COLEY'S TOXINES.*

BY FRANCIS P. EMERSON, M. D., BOSTON, MASS.

Disappearance of New Growth. Recovery of Health. Recurrence and Death after Seventeen Months.

It is a well known fact that the behavior of sarcomata cannot be predicted either as the result of surgical interference or from medicinal treatment. In a recent study of the literature of sarcoma of the naso-pharynx treated by arsenic it seemed to be the consensus of opinion that arsenic in full doses was particularly efficacious early when there was no glandular involvement. Recurrences were practically unmodified in their tendency toward a fatal issue. Some remarkable cases of cure by a variety of measures have been recorded where the diagnosis has been confirmed by histological findings; but most cases of record have been reported too early to be of value.

A few undoubted cases have extended over a period sufficiently long to encourage us to use every resource that can promise any relief, however desperate the clinical picture. Among these may be mentioned Bosworth's,¹ which remained well for seven years. In this case active surgical interference was employed without internal medication. Israel² reported a growth of the pharynx accompanied by deafness, difficulty in breathing and speaking—cachecia with involvement of the axillary and sub-maxillary glands. The spleen was also enlarged. The symptoms all disappeared under arsenic and there had been no recurrence at the end of five months.

1905, March 29, M. Schmiezelow, at a meeting of the So. Da-noise d'oto laryngo, reported a case in a woman of 68 years. The lateral walls of the pharynx, tonsils and fauces showed a hard non-ulcerated growth that involved the base of the tongue. The glands were enlarged. Histological examination showed lympho-adenoma. Under cacodylate of soda and X-ray treatment, at the time of writing the glands had entirely subsided and there was but a vestige of the local process. Other cases and measures might be added. The deep interest in any measure that will modify these aberrant cells or increase individual resistance, and even for a short time encourage these forlorn cases, prompts me to report the following, especially as the patient enjoyed several months of perfect health and comfort, regained her usual weight and at last died with less suffering than if she had been abandoned to her fate and charlatans.

Case. 1904, April 10, Mrs. C. S. B., widow, American, private patient, 64 years, born in Maine.

* Reported at a meeting of the New England Society of Otology and Laryngology, held at the Boston City Hospital, November 16, 1906.

Family History. Father died at 87 years. Mother died at 67 years of pneumonia. Paternal relatives died of phthisis. Two children and no miscarriages. In winter, Mrs. B. had been subject for twenty years to throat irritation and pains in the extremities which she called rheumatism. This was only an inconvenience, and never enough to confine her to the house. An old scar on the forehead was the site of a new growth which was thought to be malignant and destroyed by caustic four years ago. A bloody discharge from the left breast had existed one year. Eczema in earlier life. History of a fall six years ago, and since then the spine became sensitive when tired.

Present Illness. Following a sort throat seven weeks ago, the patient commenced to have a sense of fullness in the right tonsil while nursing a malignant case. April 10th her family physician sent her to me, when I found the following:

Examination. A large globular swelling at the site of the right tonsil, extended to the Uvula. Both anterior and posterior pillars were adherent, and the anterior surface was injected. This mass was resistant to the feel but not hard, and there were no axillary or cervical glands. No pain. She was a large woman, normally weighing two hundred and ten pounds. She felt weak and had lost twenty pounds. Throat felt dry and was very red. At first electrolytic needles were passed into the growth and the current seemed to contract the tumor, diminish the vascularity, and relieve the dryness. At this time, instead of any treatment it was my judgment to remove the mass with the cold wire snare. This was opposed by her physicians and friends and only consented to by the patient after giving away her effects and preparing for death. Under these circumstances I refused to operate and tried the electrolytic needles as above. *May 5th.* On account of rain, Mrs. B. neglected treatment for five days, and now the swelling was more pronounced with an anterior tubercle presenting. It was also apparent externally. *May 10th.* I commenced the administration of Coley's mixed toxins of erysipelas and prodigiousus. One minim in sterile water was injected into the site of the growth in the neck externally. The reaction was accompanied by a severe chill, palpitation, vomiting, intestinal pains followed by seven or eight movements in the twenty-four hours, and marked prostration. The dose was reduced one-half and then gradually increased to one minim twice weekly until May 24th, when no reaction occurred.

The external swelling was gone, but the throat remained full and the surface of the mass was ulcerating. There was a slight toxemia as evidenced by headache and drowsiness. *May 27th.* Two minims

caused no reaction except pain in the groin extending to the bladder. She had lost 28 pounds. The swelling had diminished, as the result of a large slough. She felt better and went out Decoration Day to the cemetery. *May 31st.* Three minims. *June 4th.* A fresh bottle from which four drops was used was followed by severe pain in the throat, and across the kidneys, and later hoarseness. Prostration became marked with the skin dark and mottled. Joint pains lasted through the night. Prostration continued three days. *June 11th.* Chill and prostration marked with pain across the kidneys and in the throat, accompanied by polyuria, nausea and swelling of the neck at the site of the injection. *July 2nd.* Injection in the arm on account of local soreness, of six drops, was followed by local swelling, nausea, cold sensation, diarrhea and febrile movement. *June 8th.* Seven drops was followed by nausea, excessive gas, palpitation, pain in the right leg and arm, which extended into the neck and mastoid region. The throat swells and feels prickly, the same as when injected into the tumor directly. Although these observations were recorded at these intervals, the serum was administered twice weekly. *Oct. 4th.* Patient's weight, which had dropped from 210 to 170 pounds, had now been regained to 195 pounds. There was one posterior lobe, the size of a cherry. The rest of the tonsillar tissue was about the same as the opposite side. For six months previous to the use of the toxins, she had had five bloody discharges from the breast. During the last six months, only one. Today the physical examination shows no metastases. No glands, liver and spleen normal. General health excellent. No pain in the tonsil for a month. Second microscopical report from Dr. Pratt says the tissue submitted is undoubtedly that of a spindle celled sarcoma. The presence of numerous mitotic figures indicate that it is still growing. This specimen was submitted to Dr. Mallory, and the diagnosis corroborated. *Oct. 25th.* Signs of recurrence over old area. *Dec. 27th.* Tonsillar tissue scooped out with thick edges. Both arms indurated, hot and swollen from the injections. *Jan 2d, '05.* In addition to the toxines, several X-ray treatments were tried. Although she reacts to the serum, there is no local effect on the growth. *Feb. 27th.* No injection since Feb. 1st. Metastases have appeared, and patient is failing rapidly. Died July 5th, seventeen months after the local manifestation.

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CHOICE OF ANESTHETICS IN NOSE AND THROAT SURGERY.*

BY SYLVESTER J. GOODMAN, PH. G., M. D., COLUMBUS, OHIO.

There are few subjects to which a student gives less attention during his college days than that of anesthesia. As Sir Frederick Treves has said: "There is a widespread impression that to give chloroform is a minor act—that the power comes with the granting of the diploma—and the significance of the procedure is sometimes emphasized by the remark: 'Well, if a man cannot give chloroform, what can he do?' This idea is being dispelled by the profession, slowly, to be sure (and sometimes only after one of you have had a most embarrassing experience), but nevertheless surely. I will, in the limited time allowed me for the discussion of so broad a subject, simply take up the agents most generally employed in the production of anesthesia for nose and throat surgery. No one anesthetic can be universally used if the best results are to be obtained.

The anesthetist must grasp the fact that every case of anesthesia is a study in itself, in the selection of the appropriate agent for safety and for the operator's convenience, fully appreciating that every case has its peculiar risks and after dangers which must be met in different ways in different individuals.

The relative mortality of the various general anesthetics is as follows:

Nitrous oxide, 1-100-000? (Luke.)

Ethyl bromide, 1-16000 (Patton),.

Ethyl chloride, 1-12000 (23 deaths in England in 1 year.) (Luke.)

Ether, 1-10000.

A. C. E., 1-7500 (1-2000).

Chloroform, 1-1000 (1-6000-Vaughn).

Anesthol, too early to judge (several deaths reported).

For the convenience of bringing the subject before you I will say that The Choice of Anesthetics is influenced by the following factors:

1. Type and condition of patient.
2. Age of patient.
3. Nature of operation.
4. Skill of the administrator.
5. Wishes of the operator.
6. General conditions.

* Read by request before The Oculists' and Aurists' Club, Columbus, O., Nov. 26 1905.

TYPE AND CONDITION OF PATIENT.

It is a remarkable fact that an individual whose health is somewhat impaired by disease is often a better subject for an anesthetic than a person who is in the enjoyment of perfect health. Among the laity there is a widespread impression that if the heart is sound, all must go well, whereas, in about 90 per cent. of the fatalities under chloroform, at the post-mortem examination the heart is found to be perfectly normal. (Luke.)

Far more importance must be attached to the nervous disposition and temperament of the patient, and the amount of alcohol and tobacco he is accustomed to use. A healthy, vigorous male adult is by no means the best subject for anesthesia in many cases, although the heart and lungs may be in excellent condition and able to stand any strain which may be put upon them, yet, the subject will not pass so readily and smoothly into the anesthetic sleep, in most cases, as a less robust type of patient, but will show greater tendency, as a rule, to struggling and excitement, which will interfere with the respiratory rhythm. Anemic patients, and the subjects of tuberculous disease (if we exclude active pulmonary tuberculosis), are better anesthetised with ether than with chloroform, as their blood pressure readily becomes unduly depressed by the latter anesthetic.

Fat people always give the anesthetist some trouble when the method employed involves any air limitations, and to fully anesthetise a fat, short-necked person by means of any inhaler, without producing undue secretion of mucus and saliva, with the accompanying cyanosis, is well nigh impossible. For this type of patient, therefore, chloroform, preceded by ethyl bromide, given with plenty of air, is indicated.

Edentulous people are sometimes troublesome owing to the tendency to suck in the lips in a valve-like fashion, and obstruct the air way. Patients who have *adenoid growths*, and *enlarged tonsils*, says Kolisko, "are not good subjects for any anesthetic, and in dealing with them chloroform should, as far as possible, be voided, especially in the case of children, as the adenoids are often associated with the "status lymphaticus" and persistent thymus gland.

This I do not believe to be true if the chloroform be preceded by ethylbromide, as much less chloroform is needed when this is done. In nearly 100 cases of ethylbromide-chloroform anesthesia for the removal of adenoids and tonsils, I have seen no untoward symptoms, and 75 per cent of the patients were children. In fact, most authorities on anesthesia concede the preference to chloroform rather than ether in operating on children generally.

In goitre, angina Ludovici, or any condition involving much constriction of the air passages with accompanying dyspnea, great care is necessary to use no anesthetic or method of administration which will in any way hamper the breathing or cause cyanosis. Several deaths have occurred under nitrous oxid and ethyl chloride in such cases. Kocher and Berry refuse to use any anesthetic in these cases, owing to the great danger. I have twice used ethyl bromide in these cases with no complications. Asthma contra-indicates the use of ether. In cardiac diseases, especially valvular diseases, chloroform is often better borne than ether, but great care must be used with either of them.

In patients with cardiac myasthenia, simple or fatty, in dilation without hypertrophy and in diseases of the coronary arteries, chloroform is especially contra-indicated as is also nitrous oxide. In conditions of renal inadequacy, both chloroform and ether are to be used with great care, for ether congests the kidney unduly, aggravating the albuminuria, while chloroform often increases the degenerative changes in the kidney substance. Diabetic patients are bad subjects for chloroform, for after regaining consciousness they frequently become comatose and die from acetonemia.

Insane patients should have chloroform preceded by ethyl bromide.

AGE OF PATIENT.

The age of the patient has little to do with the choice of anesthetic except that in children there is a tendency to embarrassing secretion of mucus and saliva with cyanosis and stertor if ether is used.

SKILL OF ADMINISTRATOR.

Let us all agree that no man, however learned he may be, has any right to administer an anesthetic until by long and careful observation, extended research and common sense judgment, he has prepared himself to undertake a task in many cases more dangerous than the operation. I would not for an instant have you think that any anesthetic is entirely void of danger—even in the hands of an expert. But, gentlemen, who shall say that anything is safe in the hands of a tyro.

THE WISHES OF THE OPERATOR.

The wishes of the operator, with all due consideration of the patient's condition, etc., should be paramount, for it is obviously unfair to the surgeon and undesirable for the patient that the former should for one moment feel that he is embarrassed in his work in any way. (Luke.)

Further, in some cases, it may be desirable to commence with one anesthetic and continue anesthesia with another. Many deaths un-

der anesthesia have been due to persistence in the use of an anesthetic which, to *the initiated*, was obviously unsuited for the patient. The preparation of the patient is also an important factor.

GENERAL CONDITIONS.

What would your wishes concerning the choice of an anesthetic amount to if a brother of the patient to be operated upon had lately died as a result of anesthesia? Suppose he had died of ether. No matter what you desire, I think you would use some other agent. Or, if for any reason, the family or friends are prejudiced against any agent, don't use it. Or, if you prefer ether and have only chloroform at hand, I suppose you had better use the latter.

Now what anesthetic shall be used? Shall it be ether; shall it be chloroform; or what?

Since of all the operations performed upon the nose and throat and accessory organs, requiring anesthesia, the removal of tonsils and adenoids is perhaps as common as any, we will confine our remarks to the application of anesthesia for this one operation. Most of you use ether; some use chloroform; several use ethyl bromide, or chloride, either alone or assisted by chloroform or ether.

Why you should prefer ether to chloroform, or either of them to ethyl bromide, I have failed as yet to be convinced. When you wish to operate in the region of the naso-pharynx, it seems to me that you would want as little blood and mucus as possible. The blood or mucus acts as a foreign body and obstructs respiration, exactly what you do not want. All authorities agree that ether embarrasses respiration. Ether also causes the production of an excess of mucus; and raises the blood pressure and increases the hemorrhage. Now what have you gained by its use? Suppose you had used chloroform. The mucus would have been less; to be sure, the heart and blood pressure would have been some depressed, but how much? The chloroform stimulates at first, and hence since the anesthesia is only momentary the hemorrhage would be about the same. But you have not used a respiratory depressant. Also when you administer the ether, whether by open drop or Allis method, the apparatus is cumbersome and if the anesthesia is to be renewed for a moment, the whole face must be covered up. With chloroform, the small Esmarch mask or pad or gauze of the forceps is all that is needed and anesthesia can be renewed while the surgeon works.

My method, which I am inclined to think the best, when used by one who is experienced (and please note that I say in experienced hands) is called the *ethyl bromide method*. When the technic of ad-

ministration is modified by the giving of a preliminary hypodermic injection of scopolamine and morphine, I refer to it as the *scopolamine morphine ethyl bromide method*."

How shall I convince you that this method is better than the use of ether or chloroform? One of your colleagues informs me that he likes ether because he can trust it to a student. You can not trust my method to a student. Another tells me he is prejudiced against chloroform because he had a death from chloroform, with the resulting advertisement. Now, gentlemen, when you trust ether to a student or chloroform to an inexperienced old man, long in his dotage, what can you expect? Ethyl bromide would kill, too, if placed into the same hands.

My desire is to convince you of the merits of this drug, when handled by an anesthetiser. Let us compare the manner in which the patient passes under the influence of the anesthesia when the different agents are used.

ETHER.

Apparatus—Allis inhaler, can of ether. Average time to cause relaxation from 3 to 15 minutes. Amount used 1 to 4 ounces, depending upon how much runs through the mask into the patient's eyes, etc.

First Stage. Swallowing, cough, some holding of breath, rather more common than with chloroform. Pulse accelerated and pupils large and mobile; conscious but no pain. Teeth may be pulled and incisions made. Easily awakened and no sickness; no relaxation.

Second Stage, Stage of Excitement. Patient becomes abruptly unconscious; memory, volition and intelligence abolished; questions answered in nonsensical manner; *struggling, shouting, singing* in robust patients. "Ether tremor" is seen. Face flushed, conjunctiva injected and perspiration on face. Pulse quickened and robust in quality. Breathing inclined to be hampered during this stage owing to muscular spasm. Do not annoy the etherizer by pumping the patient at this stage; leave them alone. The spasm passes off soon and the patient enters the

Third Stage, True Surgical Anesthesia. The cornea is now insensitive to touch, muscular relaxation is present and extremities are flaccid. Breathing is regular and stertorous. Pupils respond sluggishly to light. Pulse full, bounding and regular and somewhat slowed down. Free perspiration.

The *complications and difficulties* arising during ether anesthesia are:

1. Overdose.

2. Respiratory embarrassment leading to failure. This may occur during first stage, independent of overdose, and pass away as anesthesia becomes deeper.

3. Heart failure due to overdose or heart disease, goitre, hemorrhage.

4. Foreign bodies as blood, mucus, etc., may pass into larynx and trachea.

5. Apoplexy may occur when the arteries are brittle.

The *Contra-indications* according to Luke are:

1. Protracted operations on jaws or mouth.

2. Where cautery is used or where lights and fires are likely to cause an explosion.

3. In Bronchitis, Tuberculosis, Asthma, Emphysema.

4. Atheromatous arteries.

5. Renal diseases.

6. Empyema or ascites or pleural effusion.

7. *Large tonsils* or *adenoids*.

8. Brain operations, as mastoid, etc.

9. In all cases where mucus and secretions lead to respiratory obstruction or if patient's breathing becomes tumultuous.

CHLOROFORM.

Apparatus—Esmarch mask, small dropper bottle. Average time to cause relaxation 3 to 10 minutes. Amount used 1 to 4 drams. May burn patient's face. Motto of this drug, "Watch the breathing." Never worry about the pulse.

First Stage. Patient swallows and coughs slightly, restless, turns face away from anesthetic—if it is too close to his face he will hold his breath, and inevitably a long sighing respiration or gasp will follow. If this is borne in mind by the operator, he will save himself worry and embarrassment by leaving the patient alone and not jumping in and pumping the patient. This holding of the breath is only temporary and always passes away. Flashes of light, buzzing or hammering are heard in the ears. An exhilarating, thrilling sensation is felt through the body. Thoughts and ideas occur in the most rapid manner and are most vivid. Patient is conscious of surroundings but not of pain.

Second Stage. Patient now becomes rapidly unconscious. He will mutter, talk, laugh, talk nonsense, swear, respond irrationally to any questions. His conversation will run along the lines of his occupation. The face is flushed; the pulse is increased in rapidity. Pupils dilated and mobile and conjunctival reflex is still present. There is a tendency to sickness in this stage and any palor or depres-

sion of circulation in this stage should be taken as an indication for more chloroform. If the patient flushes and struggling occurs, chloroform should be withdrawn until the struggles subside.

Third Stage. The patient now becomes completely anesthetized. The breathing is regular and automatic like that of a sleeping person and often with a short quick snore. The pupils contract, but not always, and should react sluggishly to light. The lid reflex has disappeared. The muscles throughout the body are relaxed. The pulse is somewhat slower than normal and more compressible. The eye balls are fixed in a horizontal plane or rotating from side to side. You must be careful not to be misled by *false anesthesia*, especially in children, as the patient may be in a simple slumber. The pupil is then more contracted and even though the reflexes are absent, a pinch or cut will awaken them and the anesthetist is in a pretty fix. Therefore, when the pupil is very contracted, the administrator must be upon his guard to be sure of his ground before telling the operator to go ahead.

The *four signs* of full chloroform anesthesia are: 1. Automatic respiration. 2. Loss of conjunctival reflex. 3. Fixed and contracted pupil. 4. Muscular relaxation.

In *children* the *breathing* is all important; little reliance can be placed upon the pupil and less upon the conjunctival reflex. A useful sign, however, is the rotation of the eye balls downward upon the horizontal axis. However, in children it is especially well to give too little rather than too much, as we have no reflexes in children and there is danger of absolute poisoning.

The *principal troubles* arising during chloroform anesthesia, apart from chloroform poisoning, are:

1. Cessation of respiration.
2. Cardiac failure.
3. Vomiting.
4. Passage of food, mucus, etc., into air passages.

The *advantages* of *Chloroform* are:

1. Pleasant to smell and *seems* easy to administer. Produces little or no choking, so that children will often inhale it without resistance.

2. No special apparatus is needed.
3. Smallness of quantity required.
4. Quiet anesthesia.
5. Non-inflammable.

The *disadvantages* of *Chloroform* are:

1. High mortality.

2. Selective action on circulatory apparatus.
3. Depressant and protoplasmic poison.

ETHYL CHLORIDE AND ETHYL BROMIDE.

Now we come to the ethyls—ethyl chloride and ethyl bromide, as used in producing general anesthesia. Aside from chloroform and ether, ethyl chloride is used more extensively than any other agent. It has always appeared to be safe enough to trust to children. The anesthesia is produced in a few seconds without any struggling. There is no depression, nausea or vomiting and although it is very expensive, only 10 to 40 c. c. are consumed in the production of full surgical anesthesia. However, to get the best results a special mask must be used.

I used to think it about the ideal anesthetic, but when so great an authority as Mr. Luke, in his new work, reports 23 deaths in one year in England alone, I think that we should use a little caution before accepting ethyl chloride as a harmless anesthetic agent.

No such record of fatalities attends the use of ethyl bromide. The mortality, according to Patton, is only one in 16,000 anesthetics. I find record of only two deaths. I consider ethyl bromide (and note I do not say ethylene bromide) the ideal agent for short anesthesia. If the operation is to be a long one, I believe the ideal technic consists in producing surgical anesthesia with ethyl bromide and then continuing it with ether or chloroform *according to the type and condition of the patient*.

My method of producing anesthesia with ethyl bromide, used by me about 2000 times, is as follows: If the patient is a large man, or very nervous patient, or one of those big muscular hod-carriers that we see so often in the hospital, or for operations for the removal of tonsils and adenoids, I use what I call the "*quick method*." This consists of dashing about one fluid dram of the drug upon a thick piece of gauze, and applying the same closely over the face. The patient is simply smothered in it. There are one or two struggles and all is over. This will suffice to keep them asleep for from three to five minutes. If, however, a prolonged operation is intended, as soon as the patient relaxes, say in about one minute the cloth is removed and ether or chloroform administered. This does away with the terrifically violent exciting stage seen in these cases when ether or chloroform is given from the start. If the patient is very ill, not so nervous, or not so strong as to be able to overcome the anaesthetizer during the administration of the ethyl bromide, I use the "*slow method*." This consists in applying the Esmarch mask over the face, and then gradually dropping about thirty or forty drops of

ethyl bromide upon the mask, and in one-half to one minute the patient is sleeping quietly, and the same procedure as before takes place with reference to the ether or chloroform. The odor is not unpleasant, and scarcely any irritation of the air-passages is produced. If properly administered there is practically no stage of excitement. The face is flushed, the ears red, the eyes injected and the pupils more or less dilated. The heart action is accelerated, and the pulse increased in force. The respiration is quickened, and in some patients becomes snoring; but irregularity or arrest of respiration has never occurred. It does not produce nausea or vomiting. In fact, we seldom have any vomiting to amount to anything since I have been using ethyl bromide as a preliminary anesthetic. The duration of insensibility is brief, the awakening prompt, and there is little confusion of the mind when used for brief narcosis. In the fatal cases reported there is strong doubt, says Bartholow, in regard to the share of ethyl bromide in the result.

Any *untoward symptoms* during or following the use of ethyl bromide are due to one or more of the following causes:

1. Inexperience of anesthetist.
2. An impure article. Let me impress upon you that only a pure article is safe. I use Squibbs' only. It should be obtained in one-ounce vials and never allowed to stand around and decompose.
3. Some physicians have mistaken ethylene bromide for ethyl bromide. The former is very poisonous.
4. It should never be used about a gas light, as it is readily decomposed.
5. It should not be used in old men with sclerotic arteries without due caution. It should be borne in mind that when complete relaxation of muscles is required it is necessary to add a few drops of chloroform. One of the most serviceable uses of this agent is in the administration of anesthetics to the insane. Ethyl bromide is applied rapidly, and in less than one minute they are ready for the car. What under the circumstances would be a terrific exciting stage passes off quietly, and without the damaging effect of exertion upon the patient's strength.

There can be no doubt that many operations owe their fatal terminations to the large quantities of ether or chloroform given during the exciting stage. Mann of Buffalo (American Medicine, June 17), says that vomiting depends not on the kind of anesthetic used, but upon the amount. He always begins with ethyl chloride. Pneumonia, and injuries to the patient, as well as strain to the heart, are avoided by the elimination of the exciting stage of anesthesia. In

children the use of these agents is not only convenient, but necessary. Dr. Brown Kelly of Glasgow lauds ethyl bromide highly for operations about the nose and mouth, as removal of tonsils and adenoids, because it strikes the happy medium of combining the good points of chloroform, nitrous oxide and ether without their disadvantages, producing an anesthesia as quiet and free from asphyxial symptoms as chloroform, and as rapid as nitrous oxide, and as stimulating as ether.

The cost of ethyl bromide, bought as we buy it, is nineteen cents per ounce. The cost of ethyl chloride is eighty cents per tube. The amount of ethyl bromide used is about thirty to sixty minims, costing about one to two and one-half cents per application. Ethyl chloride leaves a garlic odor to the breath; ethyl bromide does not.

CONCLUSION.

For brief operations ethyl bromide is the best anesthetic. For preliminary anesthesia, this product is not only convenient, but I would impress you with the fact that there is less danger when the exciting stage is eliminated by its use. Ethyl bromide is better than ethyl chloride. Severe nausea and vomiting are seldom seen after prolonged anesthesia when this agent has been used as preliminary anesthetic. Ethyl bromide is a heart stimulant and not depressant. This compound is absolutely safe in the hands of any man who understands anesthesia; nothing is safe in the hands of a novice. The average time for producing complete insensibility is from thirty to sixty seconds, but seldom longer than thirty seconds.

The *advantages* of ethyl bromide over chloroform are: 1. It can be given with the patient in any position. 2. Anesthesia is induced very much more quickly. 3. There is no struggling. 4. A measured dose can be given. 5. It is much safer. 6. The after-effects are trifling or absent.

The *advantages* over nitrous oxide are: 1. The anesthesia is of a better type; quieter; absence of suffocative symptoms. 2. No cumbrous apparatus is necessary. 3. The available anesthesia is about twice as long.

The *advantages* over ether are: 1. Much pleasanter to take. 2. Induction of anesthesia is much quicker and no struggling. 3. There is no cyanosis or secretion of mucus. 4. Does not leave an unpleasant taste in the mouth or smell in the room. 5. The after-effects are much less.

238 East State street.

TURBINECTOMY.

BY E. MORAWECK, M. D., AND G. C. HALL, M. D., LOUISVILLE, KY.

We should be very loath to enter upon a controversy upon any subject that was not dictated solely in the interests of truth and better knowledge of our work. It is with this in view that we venture to put forward this paper in the hope that the doubt and uncertainty which seems to surround this operation may be cleared away.

We are fully aware that to advocate total removal of the inferior turbinate will provoke adverse criticism from some members of the profession, chiefly it seems from those who have never performed the operation and who, therefore, base their conclusions on purely theoretical assumptions; while among those who have performed the operation there seems to be a very well founded belief that the operation is of great value.

The inferior turbinate thus occupies a unique and anomalous position in its surgical existence inasmuch as certain members of the profession fear its removal even when manifestly diseased. These same gentlemen have no hesitation in repeatedly searing its surface with hot platinum points or chemical caustics, however ineffective they may be in relieving the nasal obstruction; but they decry an operation that does satisfactorily remove the obstruction with an array of reasons none of which are founded on facts.

It is said that such an operation results in undue dryness in the nose and throat, that it renders the lower respiratory tract more liable to infection, that it induces an atrophic rhinitis with formation of crusts and odor, that the air will not be properly warmed on entrance into the lungs, inducing laryngeal and bronchial troubles, that it has some function of which we know not, that is essential to the animal economy and that its presence, however diseased, is sacred. The only objection we can find to all these statements is that they are not supported by the facts in the case as many operated cases will show, the operation in fact relieving in many cases the very things that the removal is supposed to cause.

During the past year we have removed considerably more than a hundred inferior turbinates, sometimes on both sides, and have never seen the distressing dryness that is spoken of. We have never seen it induce pharyngeal or laryngeal trouble or pathological conditions lower down. In fact, it usually stopped them by curing the

patient of mouth breathing. We have never seen crust formation or odor after the wound was healed unless there previously existed suppuration in the accessory sinuses. As far as the unknown function is concerned we can only say that we have never seen harmful results follow the removal. The patients all breathe better, have a better facial expression, are relieved of the necessity of continually clearing the nose and throat and the dropping of mucus from the naso-pharynx stops. By allowing for a free passage of air into the lungs, relieving all obstruction, infection and "catching cold" is much lessened or when it does occur is relieved of much of its disagreeable features, since the nose doesn't stop up. It has also a most favorable influence on the course of catarrhal deafness.

Briefly considered the inferior turbinates are attached to the outer wall of the nose near its floor. They are developed separately from the other turbinates and are not part of the ethmoid. They are the largest of the turbinates and extend from the vestibule backward, enlarging as they extend to terminate in a posterior free end very near the mouth of the Eustachian tube. They are composed of soft cellular bone covered with a thick mucous membrane, having large venous plexuses and capable of great swelling and reduction, containing in fact true erectile tissue. It is this power of expansion that makes the medicinal treatment of hypertrophic rhinitis futile. The posterior free end is especially liable to swell and when hypertrophied presents the appearance of a papilloma. It is this swollen end that is chiefly responsible for the involvement of the Eustachian tube and deafness in acute coryza. The third volume of Spalteholz's Atlas of Human Anatomy contains a beautiful cut of these structures and shows the relations to the surrounding parts. The function of these bodies, as far as we know, is to warm and moisten the air before it enters the lungs. They are not concerned in the sense of smell.

Sometime ago considerable discussion took place as to what path the air followed after entering the nose, whether it traversed the upper structures or the lower on its path to the throat. It appears to us, however, that it would follow the path of least resistance, regardless of its situation, as there is no reason why this law of nature should be violated in this instance. This has a direct bearing on the operation as there are some who insist that, as we breathe through the middle meatus, we should remove the middle turbinate in obstructive conditions.

Granting then that the structure is normal, it is most certainly to be let alone unless removal is required to gain access to other

regions, as in opening the Antrum of Highmore. When, however, these structures become pathological, as they do very often, especially in this climate, there seems to be no good reason why they should not be attacked and radically so. As far as we are aware, the credit of putting this operation before the profession belongs to Dr. Dudley S. Reynolds of this city.

The indications for the operation we would list as follows: (a) When the nose is too narrow for free respiration; (b) When there is difficulty in blowing the nose, with retained secretions; (c) A history of catching cold easily and mouth breathing at all times or only at night, with a dry parched mouth and tongue and large collections of mucus in the naso-pharynx which must be expelled every morning; (d) Cases where the two sides alternately open and close with one side always closed; (e) In very large turbinates of the nodular variety that do not shrink on the application of adrenalin and cocaine; (f) Where the nose is occluded on one side due to septal deformity which is of such a nature as to defy correction; (g) It is a matter of common observation that, in deflected septums, the inferior turbinate on the concave side of the deflection is hypertrophied, while in the majority of cases the one on the convex side is more or less atrophied. If, therefore, the septum is brought to the median line, as it should be, while it relieves the stenosis that existed on the convex side of the deflection, it causes a stenosis on what was the concave side by reason of the hypertrophied inferior turbinate. It is, therefore, advisable in such cases as are considerably hypertrophied to remove the turbinate first and allow that to heal before attempting the submucous resection. (h) To gain access to other regions as in the intranasal treatment of Antral suppurations with opening of the outer wall under the turbinate as practiced by Curtis and Richards. (i) To remedy other conditions, as in a chronic catarrhal state in the middle ear, if the nose is at all obstructed; and, in such cases, particular attention should be paid to the removal of the posterior end, a marked improvement in hearing often taking place after such work, particularly if the case is recent. (j) In chronic catarrhal conditions in the throat with cough, dropping of mucus from naso-pharynx and hypertrophy of the lymphoid tissues in the pharynx. (k) In many so-called rheumatic throats relief may be had when all other means fail.

As an adjunct in the treatment of Hay fever. The chief form of discomfort these unfortunates experience is due to obstruction in the nose and it is very clear that with a good free breathing space in the nose by removal of both inferior turbinates one of the chief

sources of discomfort is removed. It seems also to have a favorable effect on the eye as well as on the asthmatic seizures that are so distressing. The chief reason why many have reported unfavorably on the new remedy "Pollantin" we believe to be due to the fact that failure to first reduce the inferior turbinates prevented the remedy from penetrating into the nasal chambers. We have a number of patients who by means of this treatment have been so far relieved of their trouble that we can pronounce them cured.

This operation has proved so successful in our hands that it has practically superseded all cautery operations, which are not to be compared with it in efficiency. The more we see of cautery work, the more we are impressed with its relative insufficiency; for it must of necessity leave untouched the very part of the turbinate which gives rise to the most trouble—namely, the posterior end. Snaring off the posterior end with a cold wire snare is a better procedure than the cautery but is still not radical enough, the purpose being to effectually prevent any part of the turbinate from impinging against the septum and forming a source of irritation or infection.

The method of performing this operation is of the greatest importance for it can be made painful or painless, efficient or inefficient, according to the method employed. It is contraindicated in all acute troubles in the nose or adjacent structures. Pus in the accessory cavities should be removed as far as is possible.

We prefer to do the operation as soon after a meal as possible, as the patients seem to stand the cocaine better. Strychnine by the mouth also precedes the cocaine, which is used in conjunction with suprarenalin. The vibrissæ are first clipped, then the nose and throat are thoroughly cleansed with a mild alkaline spray and suprarenalin 1-3000 is instilled into the nose to shrink the tissues. Cocaine is now applied over the surface of the body of the turbinate by means of cotton wound applicators and rubbed in at short intervals, care being taken that no excess fluid runs down into the throat to produce a very disagreeable dryness. We wish to emphasize the fact that the anesthetic should be applied to the turbinate only. For this reason, we never spray cocaine or apply strips of cotton to the parts to remain in place, as this gives but an indifferent anæsthesia at best, and the excess fluid runs into the throat. We formerly used a cocaine solution of a strength of a drachm to an ounce of water slightly carbolated, but recently have been using the cocaine in powder form with only enough of strong cocaine solution or suprarenalin to moisten the cotton and hold the powder. Absolute anæ-

thesia can be obtained in this way in thirty to forty-five minutes.

Care must be taken to thoroughly deaden the upper posterior surface of the growth and under its shelving edge as the lines of the incisions are in these situations. After testing all parts with a probe to see that they are thoroughly deadened, any adhesions between the turbinate and septum or floor of the nose are broken up.

In case you have a very nervous patient where you must operate quickly and the bony structure is thin, especially in children, we pass Ballinger's swivel turbinotome to the posterior wall of the pharynx, slipping the knife edge behind the free end of the turbinate and with a steady pull remove the growth which usually comes out with the knife. It has been suggested that we engage the turbinate from the front and cut from before backward; this, however, does not seem to us so good a method as the forward cut, since a small shred of mucous membrane often remains attached which would be hard to remove on the posterior surface and if attempt were made to pull out the growth with forceps, considerable laceration of the mucous membrane would follow. By this method, too, the growth may be pushed into the pharynx, which would be disagreeable to the patient. After the growth is removed any loose shreds of mucous membrane are clipped with scissors, bleeding, which is very slight, is arrested, compound tincture of benzoin is applied to the wound as a protective dressing, and the nose is ready for packing.

The second method of operating is after freeing any adhesions to slip a thin bladed nasal saw with an up cut under the edge of the growth and push it back to the posterior wall. Then with a long easy sweep, without trying to force the instrument, saw through to the mucous membrane of the upper surface. This can be accomplished in about a minute. The operation is completed with Jackson's turbinectomy scissors, which are admirably adapted for the purpose, care being taken that the mucous membrane over the entire length of the bone is severed or when the forceps grasp the growth for removal the membrane will be stripped off any portions that remain and thus healing will be retarded. The growth will then fall to the floor of the nose and it may be a little difficult to see on account of the blood, but if the forceps are pressed well down no trouble need be experienced in removing it. As in the first method any loose shreds of membrane are clipped away, compound tincture of benzoin applied and the nose is ready for the packing.

At this point, it is a good plan to inspect the growth to see that it is all removed, particularly the posterior end. In looking into

the nose at this time the posterior wall of pharynx should be distinctly seen.

We always pack the nose after this operation, but instead of using the old fashioned long gauze strip, which was so painful and which could not be applied smoothly, we use strips of gauze ten inches long and one-half inch wide laid in piece by piece with a packer until the nose is quite full. This is similar to Dr. Otto Freer's method for packing after submucous resection of the septum. The projecting ends are cut off close to the nose. After the first piece of gauze is in position the thumb of the unengaged hand (no speculum is used) holds the strip in place while the second piece is being inserted, and so on. At first we used the gauze dry but now we use every other piece soaked in an antiseptic ointment, as it prevents sticking on removal and causes less pain and hemorrhage. Recently we have been putting the paraffin and wax splint we described in the *Journal of the American Medical Association*, Feb. 24th, 1906, next to the wound and packing the gauze between it and the septum.

After two days, the gauze is removed piece by piece, beginning at the bottom piece, as there is no wound there, and after this piece is started the rest can be removed with very little pain and no bleeding except for the last one or two at the top. A sharp hemorrhage lasting for several minutes sometimes follows removal of these last pieces but usually requires nothing more than a cotton plug in the anterior nares while a clot is forming. We have never had to resort to repacking, though at times we give ergot either by mouth or hypodermatically if the bleeding is free and the patient resides at any great distance from the office. The day we remove the packing we make no effort to clean the nose, simply allowing a firm clot to fill up the operated side. The next day, however, the nose is washed free from all clots and secretion and examined carefully to see that there is no danger of adhesions between the septum and remains of the turbinate which in some cases are capable of swelling to a remarkable degree. Our guide here is the posterior pharyngeal wall. If that can be easily seen past the whole operated area there is no danger of adhesions. If, however, it cannot, or where the nose is very narrow, we insert one of our paraffin splints to hold the parts separated. As this is apt to give rise to some pain, we have recently, as mentioned above, inserted this splint against the wound at the time of operation, packing between it and the septum, so that after the gauze is removed, we still have the splint holding the two surfaces sepa-

rated. This splint we allow to remain for one week and by this time all swelling is reduced and it is no longer necessary. As we said in our paper on the subject, after their insertion these splints give rise to no discomfort and have no tendency to harbor infection.

It takes about two weeks for the wound to heal; but only during the first few days does it demand any special attention. After that we have the patient report for simple cleansing and inspection every day or other day for two weeks. Occasionally a crust will be expelled at intervals for a longer period but this may be readily controlled by applications of 5 per cent Ichthyol Glycerine. With the healing of the wound all symptoms disappear and the patient is well.

Now the important thing, especially from the standpoint of the patient, is, what are the results of this procedure? In the first place, though almost a major operation, it is practically without danger. It can be accomplished without pain and with very little discomfort. It is not harmful in any way. In all cases, where indicated, it gives an almost certain prospect of cure without a chance for recurrence.

In simple stenosis of the nose or hypertrophic rhinitis, it is much superior to the septal or cautery operations because you remove the tissue at fault and get a much freer breathing space than with the others. By the cure of mouth breathing, it speedily relieves the disagreeable symptoms in the naso-pharynx and pharynx and will cure many patients whom the removal of adenoids has failed to relieve. Its beneficial effects in middle ear catarrh are due to establishing a large open nose for drainage and breathing, lessening the congestion and secretion and enabling the patient to cleanse his nose with less effort, lessening the danger of blowing mucus and infected particles into the middle ear. In Hay fever, by relieving the chief source of obstruction, it enables the patient to breathe through the nose, limits the burning and discharge and modifies the asthmatic and eye symptoms.

In conclusion we might say that we do not wish to leave the impression that all inferior turbinates should be removed or that we consider them a functionless body, far from it; but we do believe that when diseased they are amenable to the same surgical laws as are other structures of the body, and that they possess no such divine qualities as was intimated by some of the gentlemen who discussed Dr. Reynolds' paper at the American Academy of Ophthalmology and Oto-Laryngology at Denver in August, 1904.

Gaulbert Bldg.

PAPILLOMA OF THE LARYNX IN A CHILD.*

BY JOSEPH C. BECK, M. D., CHICAGO.

Theresa A., 5½ years old, hoarseness for about six months which is gradually increasing. An embarrassment in respiration, particularly inspiration. The last three weeks, this latter condition has been getting rapidly worse, so that at the time of presentation the child breathes very hard and labored, getting blue and perspiring, especially when sleeping. There is no history of any inflammatory condition or infectious disease previous to the development of this condition, no history of lues, tuberculosis or malignancy in family and no signs about the child of anything suggestive of such conditions. She is one of thirteen healthy living children.

Examination. A fairly well nourished child with negative findings in the nose, nasopharynx and oropharynx. Laryngeal examination was almost impossible, but, by the Kirschstein method one can see an infantile appearing epiglottis and some kind of an irregular growth closing the rima glottidis. No marked inflammatory signs surrounding this condition. The X-ray reveals nothing and the chest examination, as well as the rest of the body, blood, urin analysis negative. Three days and nights constant observation at the hospital showed the condition of choking rapidly increasing and this demands some kind of interference.

Treatment. Having in mind the probable diagnosis of a papilloma of the larynx and having looked up literature on the subject I came to the conclusion that it would be best to do a tracheotomy and observe the patient. This was done about 4½ months ago with the result of complete cessation of the obstructive symptoms and an uneventful recovery from the tracheotomy.

It has been stated positively by several writers, particularly L. N. McCreery (Laryngoscope, June 1906), also Wilson, and J. Payson Clark, that the simple procedure of tracheotomy sufficed to bring about a disappearance of this pathological condition and upon these authoritative statements I expected similar results. I am therefore very happy to state that this growth is rapidly diminishing and I wish to show the patient at this time in order that at a future period, when a complete cure has been established we might be better able to judge than if I were to show the case when absolutely cured.

I would be very happy if some gentleman, who may have had similar experiences, would state as to the length of time the tracheotomy tube may be left in place for it certainly causes a certain amount of irritation which is bound to cause a stricture of the trachea.

1220 N. Clarke Ave. Lakewood Station.

* Read before the Chicago Laryngological and Otological Society, October 16, 1906.

A CASE OF TUBERCULOUS ULCERATION OF THE TONGUE.*

BY JAMES T. CAMPBELL, M. D., CHICAGO, ILL.

Tuberculous disease of the tongue was formerly considered a late complication of pulmonary phthisis, but better clinical observations and microscopical examinations have proven that tuberculous nodules, fissures and ulcers may occur primarily. When tuberculous ulcers occur late in the course of pulmonary phthisis men are usually the subjects, due, possibly, to irritation caused by rough pipe stems and hot tobacco smoke.

A peculiar feature of the tongue (and this peculiarity was noted in the case presented) is the absence of typical formation of tubercles, giant cells rarely occurring and bacilli being scarce. In our case, there was simple proliferation of the epithelium and some round cell infiltration. Except for the fact that there was no dipping downward of epithelium, the tissue looked like epithelioma.

Tuberculous fissures are generally short, occurring at the tip or sides of the tongue, often stellate or branched and generally single. The fissures are really fissured ulcers without vascular granulation, but with slightly indurated margins. If the sharp-cut or beveled edges are drawn apart, the depth and breadth of the fissure will be found to be greater than a superficial examination indicates. The sides of the cleft are prone to caseate and break down, rapidly forming a foul and ragged surface. In the vicinity of the ulcer, yellowish-gray points or nodules are sometimes observed, but they break down into ulcers before attaining a growth the size of a pea.

At first an ulcer is indolent, not painful or sore. As the disease advances, however, it becomes so sensitive that the passage of the softest food causes excessive pain. About this time, salivation becomes a prominent symptom.

The lymphatic glands beneath the jaw are enlarged in the majority of cases, but not invariably so. The usual course of these ulcers is towards a fatal issue; but occasionally the superficial ulcers heal, although they may have existed for many weeks or months. The healing is usually temporary, however, for they break down again and the disease pursues its lethal course.

* Read before the Chicago Laryngological and Otological Society.

In the absence of other symptoms, the diagnosis of tuberculosis of the tongue is often extremely difficult. The diseases for which it is most frequently mistaken are syphilis and carcinoma, and often-times one can exclude these only after constitutional treatment and microscopical examination of excised sections.

History. The patient, M. S., aged thirty-three, lived a rather irregular life, the scars on his face and neck being signs of mortal combat. He has been in the County Hospital, where on two occasions, within the interval of one month, serious pleuritic effusion was aspirated.

For the past thirteen months, the patient has had morning cough and expectoration, but no night sweats, no wasting, no loss of appetite, and no appreciable elevation of temperature. He has been hoarse for six months, but as there was no pain, it was attributed to "a cold." Four months ago he noticed a small, painless fissure on the dorsum of the tongue, which has gradually increased in size, and now forms the present anterior ulcer. The smaller fissure appeared about one month later.

A smear from the depth of the larger ulcer was examined, but only pus-cells and streptococci were found. He would not permit excision of tissue for guinea pig inoculation.

Examination of the morning sputum showed tubercle bacilli in abundance. There was dullness on precussion over both upper lobes with increased vocal fremitus and moist rales in the infra-clavicular regions. The free border of the left vocal cord is deeply ulcerated and an infiltration with ulceration is present in the interarytenoid space.

Along the central line on the dorsum of the tongue, commencing 12 cm. from the tip, is a deep fissure of irregular outline, extending backward 12 mm. When opened it shows undermined beveled edges and is really an excavated ulcer 6 mm. in breadth.

Further back and to the left of the central line 30 mm. from the tongue's tip is a smaller fissure 10 mm. long, which is directed forward and outward. A short branch 4 mm. long extends toward the center of the tongue, forming a Y-shaped fissure. When opened it proved also to be an excavated ulcer.

There has been no glandular enlargement, and until recently, the ulcers on the tongue have occasioned no pain.

34 Washington street.

NEW INSTRUMENTS.*

BY LOUIS OSTROM, M. D., ROCK ISLAND, ILL.

SIMPLE EPIGLOTTIS RETRACTOR.

In operating on the anterior portion of the vocal cords, or adjacent parts, the anatomical structures at times interfere with exact

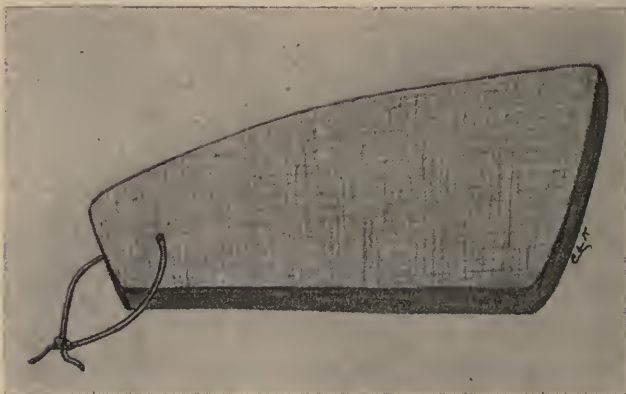


Simple Epiglottis Retractor.

manipulations. This is especially true as regards the epiglottis, which sometimes is very troublesome, overhanging the glottis,

* Presented before the Chicago Laryngological and Otological Society, December 11, 1906

and obstructing a perfect view in the laryngoscope. In a few cases, a clear view of the anterior end of the vocal cords cannot be obtained by any method, unless the epiglottis is held forward by some form of probe, even though we have a patient very tolerant to laryngeal manipulations and pull forward the tongue and place head and neck in the most favorable position. In such cases, which, of course, are rare, one needs another hand in order to do accurate work. A very simple contrivance will do away with the difficulty, and in no way interfere with any manipulation. It is an ordinary small rubber band fastened by a slip-knot at each end to the laryngeal instrument, so that an end is on each side of the angle. The action of the rubber band can be modified by



Method of Extracting Bernays' Sponge from the Nose.

using a short one or a long one, thick or thin; and by the use of a slip-knot each end can be moved to any desirable location to vary the retracting action. It does not in any way interfere with the movement of any form of forceps, curettes or applicators, nor does it slip if properly attached.

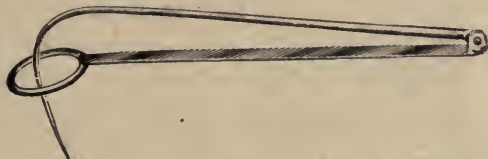
METHOD OF EXTRACTING BERNAYS' SPONGE FROM THE NOSE.

About the only objection against the compressed cotton (Bernay's) nasal sponges is the difficulty in removing them from any part of the nasal cavity excepting the anterior portion. If the nasal tissues have swollen, as is usually the case, it is not easy to see the packing, and the tissues are tender and sore, so that it is

quite painful to remove it, and portions may be left in the nose and produce subsequent trouble. Personally, I now use these sponges in nearly all my intranasal operations, submucous resection of septum, middle or inferior turbinectomies, spurs, etc., and find that after-treatment is reduced to a minimum with less liability to infection than when I used gauze. By running a strong thread through one end of the sponge, it can be placed anywhere in the nose, and as many as one likes may be used; and no matter how much the tissues swell up, all that is necessary is to catch hold of the knot and pull out the whole packing with the least amount of pain or injury. The sponge may be covered with rubber tissue, paraffin, or any other material if it is so desired, to protect the nasal mucosa.

LOCALIZER OF SUPERIOR OBLIQUE IN THE KILLIAN OPERATION.

I have seen four cases where diplopia was constant after the Killian operation (performed by some of the best European rhinologists), where the entire floor of the frontal sinus had been re-



Localizer of Superior Oblique in the Killian Operation.

moved. I have also seen very many where there was no diplopia after the operation. As long as there is any danger of diplopia after this very useful operation, when the pulley of the superior oblique is separated from its bony attachment, any method by which the pulley is made more safe is worth adoption. With this little instrument the exact location of the pulley can be found, and with no loss of time. The pulley can easily be felt by the index finger, and the ring of the localizer is then pushed in over it, so that the pulley is felt inside the ring. The needle or finder is then brought over the edge of the frontal bony wall and falls on the floor of the frontal sinus, exactly in the center of the ring, or over the attachment of the pulley. A mark can then be made, and this portion of the bone saved. The instrument can be quickly adjusted to suit any case. It is made by F. A. Hardy & Co., Chicago.

POSTERIOR SUBMUCOUS ELEVATOR.

In an experience of over one hundred and thirty (130) submucous resections of the septum, I have found this instrument almost invaluable. Elevation of the mucous membrane of the septum is usually very easy with Freer's elevators, but I have rather often punched a hole in one side of the mucous membrane in going around corners and angles, when pushing backwards. I have seen many other surgeons do the same thing. I feel safer pulling than pushing, especially over the maxillary crest, so when I have elevated all the mucous membrane that separates easily with

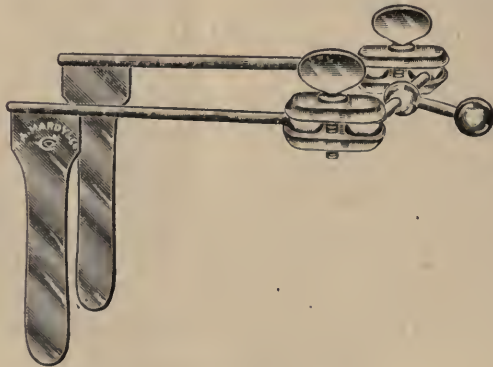


Posterior Submucous Elevator.

Freer's dull elevator, I use this right-angle elevator almost exclusively, and find that I can do faster and safer work than ever before, and that there is much less laceration or traumatism, especially at the anterior end of the crest, where the toughest adhesions are usually found. Also at points where previous cautery or sawing operations have formed firm adhesions, it is very helpful in elevating from behind as well as from in front. It is an ordinary dental burnisher bent at right angles, which can be further modified into an acute or obtuse angle.

SELF-RETAINING NASAL RETRACTOR.

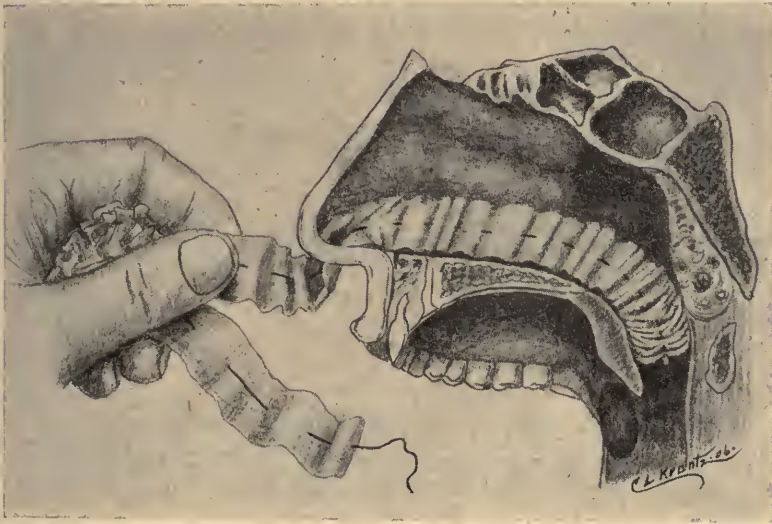
The self-retaining retractor shown herewith is universal in its movements, and is more easily managed than an assistant. The



Self-Retaining Nasal Retractor.

head band should be wide, so that it can be applied firmly to the patient's head. The arms and blades are pliable, so that any posi-

tion can be obtained with one or both blades independent of each other. By bending the blades, they can be used as a simple speculum, or deeper as retractors. No matter how the patient moves, the blades are always in the same position, and easily bent away so as not to be in the way if not needed. It does away with the disagreeable shifts produced at times when the assistant changes position or moves his body. It combines all the features of the different specula, with the additional substitution for the retracting assistant, giving us more room about the patient. It is made by F. A. Hardy & Co. and Von Mueller & Co., both of Chicago.



Simple Nasal and Post-Nasal Packing.

SIMPLE NASAL AND POST-NASAL PACKING.

Severe hemorrhage from the nose or post-nasal space is not uncommon. Packing the post-nasal space is easy if you have a tractable patient, but even then the gauze pad is not always easily adjusted, and it takes time and some apparatus, and bleeding interferes with accurate work. In packing through the nostrils it is still easier if the bleeding is not in the post-nasal space, but the great difficulty is that if gauze strips or anything else of the kind is used, it is very apt to fall down into the pharynx during gagging or hawking, and defeat its purpose. Furthermore, it cannot

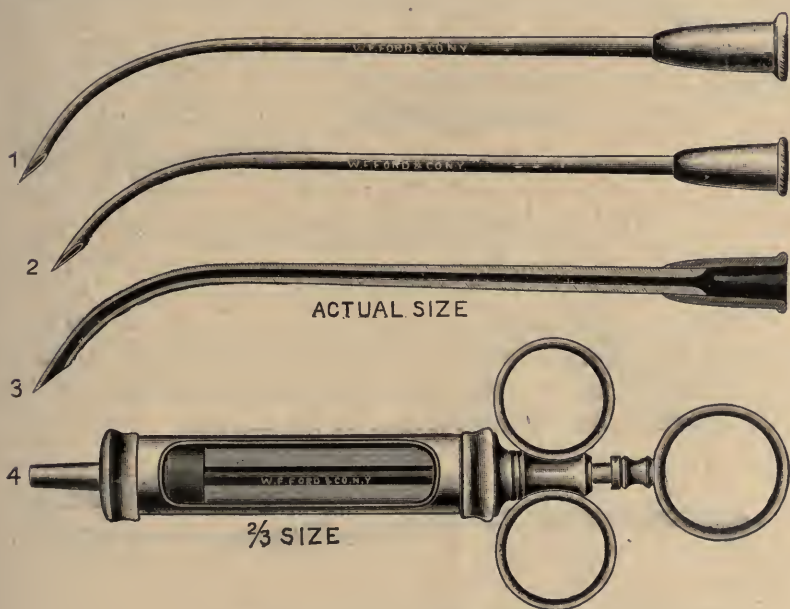
be packed very firm. Compressed cotton sponges (Bernays) are not suitable for post-nasal packing. In some cases of severe post-nasal hemorrhage, one of them in a haemophilic, all manner of packing had been used, with no avail, until I used the method to be described, which is so simple that it can always be used if we can get a string and a piece of cloth. It may also be used in any blind cavity. By tying one end of a string, preferably strong black silk, to one end of a gauze strip, and taking long stitches (basting or drawstring) through the gauze or strips, the gauze, with knot attached, is packed through the nostril into the nose or post-nasal space, and the string pulled on at times to pack from behind, until enough has been accomplished. The gauze may be treated with any kind of medication. If it is desired to pack the entire nasal cavity from post-nasal space forward, several such basted gauze strips of any desired length or width can be used and can be packed as firmly behind, by pulling on the basting string, as by packing from in front, with no inconvenience on account of any hemorrhage that may be present. The packing is easily and quickly removed by simply pulling out the gauze and letting the string slip through it, and, if necessary, it only takes a moment to repack the nasal cavity.

People's National Bank.

NEW NASAL INSTRUMENTS.*

BY J. H. ABRAHAM, M. D., NEW YORK.

These instruments are my very latest modifications, as they represent several alterations from the original idea. It affords me pleasure to present them before this Society.



Author's Antrum Syringe and Canula.

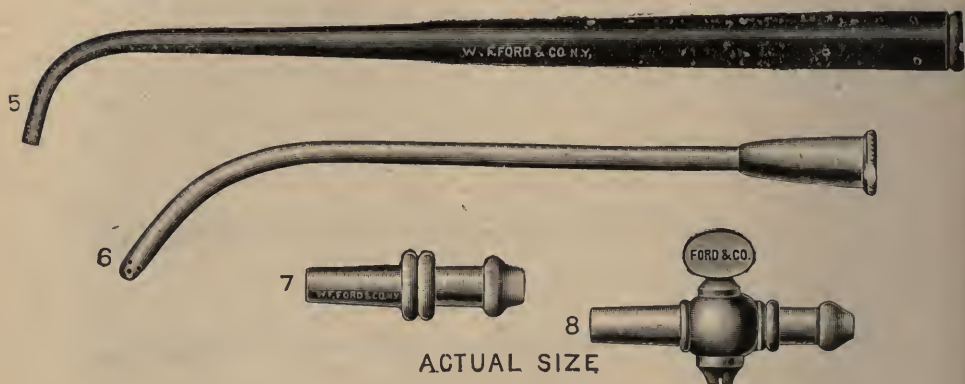
ANTRUM SYRINGE AND CANULA.

This syringe can be sterilized, as the packing is made of asbestos. The trochar and canula are made by drilling a hole through a solid graduated bar of steel, then filing to a point and curving the tip. The proximal end is twice the diameter of the distal end or tip, therefore combining great strength, delicacy and durability, as No. 3 illustrates.

Trochar and canula No. 1, is intended for the diagnosis of catarrhal or purulent lesions of the antrum and for the injection of solutions into the cavity through the middle meatus.

* Presented before the New York Academy of Medicine, Section on Laryngology and Rhinology, November 28, 1906.

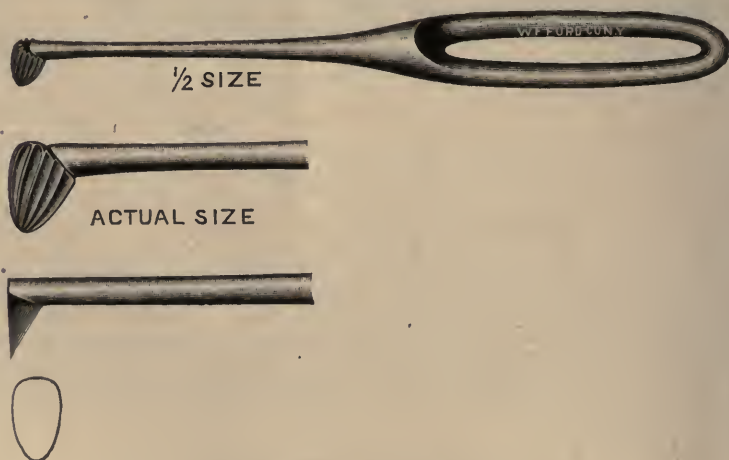
Trochar and canula No. 2, on account of its lesser curve, is intended for the inferior meatus. It is used in younger patients and narrower nasal cavities for the middle meatus.



ACTUAL SIZE
Author's Antrum Canula.

ANTRUM CANULA.

Canula No. 6 is made from pure silver, and can be curved in any desired shape. The point is closed, but perforated around the circumference, and is intended for solutions and powders, so that they can reach the various recesses of the antrum.



Author's Antrum Reamer and Burr.

Canula No. 5 is made from hard rubber, in three sizes— $1\frac{1}{2}$, 2 and 3 millimeters. It can be sterilized, and while warm the distal end can be curved, and it is intended for all the sinuses.

The proximal ends of all of these canula are of the same dimensions, so that the syringe connections will fit. Connection No. 7 is intended to be used with a large piston syringe or with the douche. No. 8 differs only in having a stop cock, so that it can be attached to a large douche for office work.

ANTRUM REAMER AND BURR.

After perforating and cutting an opening through the inner antrum wall with the reamer, the burr is inserted and the opening enlarged; then pressure should be exerted on the burr in a backward direction, and the bone cut from in front, backward and downward. To remove the bone in front of the perforation, just reverse the procedure. The bone above and below is removed by scraping along the edges with the burr.



Author's Nasal Cutting Forceps.

NASAL CUTTING FORCEPS.

This instrument is a modification of Dr. Struyckens', and instead of the blades cutting from above downward, I have altered them so that the blades cut laterally. With this forceps a number of nasal operations can be performed.

I find it a most satisfactory instrument for partial or complete removal of the turbinates, either right or left; for the removal of the ethmoidal cells it is an ideal instrument, and for the submucous operations on the septum it answers admirably for the cutting of small pieces of bone or cartilage. It combines delicacy and strength, and places the hand of the surgeon out of the field of the operation.

With these instruments the complete antrum operation through the outer nasal wall, by way of the inferior meatus, can be per-

formed in from two to five minutes under cocaine and adrenal anesthesia, including the resection of the lower border of the inferior turbinate and curetting of the maxillary sinuses, with the aid of Myles' malleable curete.

NASAL SPLINT.

These beautiful illustrations amply demonstrate a most successful splint which I have utilized in my practice since 1897. The operator can make a similar splint in a few minutes by simply following these directions: A piece of Johnson & Johnson heavy gutta percha tissue, 8 cm. x 12 cm., is immersed in a cold 3% lysol solution for fifteen minutes or longer. Cut a piece of sterilized 5% iodoform gauze 5mm. thick, 2 cm. wide and 5 cm. long. Wash the tissue in a borax solution. Place the gauze near the end and in the center of the tissue, as in Fig. 1, and tightly roll the tissue around the gauze. Cut excess tissue from ends within 5 mm. of the gauze. Moisten thumb and index finger thoroughly in lysol solution, hold tightly the end of the splint and press the tissue together. Apply heat (preferably a lighted match) carefully to the end of the tissue when it gums together, and seal the end, smooth with wet fingers. See Fig. 2. Same technique for other end. With scissors cut a triangular piece of tissue and gauze from all four angles, exposing gauze. Cut five or six nicks through tissue and gauze above and below, also both sides, and the splint is complete as in Fig. 3. Any desired size splint can be made by altering any and all dimensions.

Swabbing the nasal vestibule and splint with sterile oil facilitates its insertion. The presence of this splint in the nasal cavity is absolutely painless, and never produces granulation. Drainage is perfect. Removal is free from pain and hemorrhage.

In nearly 200 intranasal operations where this splint was inserted I have never seen a patient who had one degree of temperature. The splint should be removed in two to three days.

616 Madison avenue.



Fig. 1.



Fig. 2.



Fig. 3.

Author's Nasal Splint.

A NEW TONSILLOTOME.*

BY FRANZ C. RUPPERT, M. D., NEW YORK.

I take pleasure in presenting to you a new Tonsillotome. I am fully aware of the great variety of instruments for removing enlarged or diseased tonsils, but the fact that there are so many on the market and so different ones in use is the best proof that we have not yet found the best one. In my instrument I also have tried to contribute to an improvement of tonsillotomes. It is an instrument which, with its curve, will give more satisfactory results by its almost entire removal of the projecting mass of hypertrophied tonsil.

This tonsillotome consists of three pieces: the under and upper blades with the fork. The two blades are curved so as to form about a right angle near the cutting part, which is parallel to the handle. Through this curve is gained in the large size three-eighths of an inch or one centimeter in comparison with the ordinary



straight tonsillotome of the Matthieu or MacKenzie pattern; that is, the distance from the fork to the outer side of the cutting ring is one centimeter, so, if the round blade is introduced over the tonsil, it lies one centimeter nearer to the pharyngeal wall than the straight one. The instrument in position between the anterior and posterior faucial pillars is then pushed outwards, including the tonsil to the base. Naturally, one gets hold of almost the entire tonsil. When the knife is drawn and the tonsil amputated, the space between the pillars is pretty well cleaned out. In the smaller sizes, the distance is less.

The advantage of this curved instrument over the straight one is clear, as almost radical removal is assured. To my mind, this instrument will be of even greater value to the general practitioner who also desires to perform a successful tonsillotomy. The instrument was made for me by E. B. Meyrowitz. Especially to Mr. Goldstein of the firm am I greatly indebted for the excellent manner in which he has carried out this idea.

137 West 122d Street.

* Presented before the New York Academy of Medicine, Section on Laryngology and Rhinology, December 26, 1906.

A NEW SELF-RETAINING SEPTAL SPECULUM.

BY SAM GOLDSTEIN, A.B. M.D., NEW YORK CITY.

Resection of the nasal septum for the various deformities interfering with the normal nasal respiration and drainage, by a fairly general consensus of opinion among Rhinologists, has taken its place in the list of the requisite operative procedures that we are daily called upon to consider.

It is unnecessary at this time to review the immediate steps that have led to the adoption of the complete operation of nasal septum resection, with its various modifications dependent upon the conditions of the septum encountered in individual cases (so many reports are readily accessible in the latest literature upon the subject) as we desire only to call attention to a septal speculum that has been employed in our work for some time, and after various modifications is presented in its perfect form.

Particular attention is called to its lightness in structure, ease and simplicity of application and the comprehensive view of the operation field afforded when the instrument is in situ. After the mucous membrane on the side selected for beginning the operation is incised its muco-perichondrium thoroughly elevated, the cartilage cut, and the muco-perichondrium on the other side elevated, all adhesions on both sides removed, the speculum is placed in position. When the speculum is properly introduced into the nares through the cut muco-perichondrium and cartilage along the internal surface of the muco-perichondrium, the cartilage is fully exposed to view, and the mucous membranes are thoroughly protected against damage when Balenger's Swivel knife, Freer's knives, or any other cutting instrument can be used in the removal of the septal cartilage; furthermore, after the requisite amount of cartilage has been removed, with the speculum in position, a complete view of the bony structures i.e., vomer, maxillary ridge, etc., is afforded, so that the operative work may be continued to its completion, and the surgeon is prepared to cleanse the parts, and pack the nares.

All of the aforementioned work can be accomplished without at any time removing the speculum, as the instrument is self-retaining, closely hugging the soft tissues, and because of its lightness of construction, never acts as an obstacle to the work required to complete the operation.

A very important point to be considered in using the instrument (especially to one who has not had much experience in septal resection) is the almost complete immunity from the risk of tearing the mucous membranes when employing cutting instruments for the removal of cartilage and bone.

Many an operator, I believe, has for a time abandoned this almost requisite surgical procedure, after his first sad experience in tearing a rather wide swath through the mucous membrane that has afterward remained unhealed.

The speculum consists of two long, light and solid blades $6\frac{1}{2}$ centimeters in length, with two side springs, 7 centimeters in length. At the upper third of the right spring and penetrating it to the left spring is a slightly curved threaded bar. A lock nut



Author's Self-Retaining Septal Speculum.

rides on the bar external to the right side spring and controls the extent to which the blades may be opened. A gauge nut is placed on the bar between the two side springs, so that the blades may be opened and the mucous membrane in the nares kept fixed and as far apart as desired by the operator.

The further apart the blades can be spread without injury to the mucous membranes (although up to date, with the blades wide spread, no accident has occurred) the greater the field for operative procedure is afforded, and the less opportunity for damage permitted.

I desire to express my appreciation in the valuable aid given by Mr. I. Goldstein of the Surgical Instrument Department of E. B. Meyrowitz, of this city.

1335 Madison Avenue.

SOCIETY PROCEEDINGS. NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

Regular Meeting, January 23, 1907.

T. J. HARRIS, *Chairman.*

PRESENTATION OF CASES.

Complete Removal of Thyroid Gland. By E. V. HUBBARD, M.D.

This case had been referred to Dr. Hubbard at the Hospital by Dr. Coffin. The patient was a girl, 17 years of age, who works in a bindery. Family history is negative. Paternal grandmother had a small goitre, but not sufficiently large to require operation. Was under treatment last April for a bronchial cough. The goitre was first noticed in August and increased in size rapidly until she was seen at the Hospital the last week in October. There was then present a diffuse movable swelling of the thyroid gland extending across the neck. The neck was $14\frac{1}{2}$ inches in circumference. She was operated upon November 17th, a transverse incision being made. There were no large vessels, but the goitre was apparently fed with a capillary supply. Is not this often the result of this pathological condition? A pathological examination was made by Dr. Jonathan Wright, who reported that the goitre was exceedingly cystic. Apart from the anatomical features, an interesting point was for how long a period after the operation should symptoms of cachexia strumipriva be looked for. Dr. Tyson of Philadelphia says that some 16 per cent. of 408 cases showed cachexia, but does not mention the period within which it occurs. The girl is now perfectly well and has no symptoms of myxoedema. The whole gland was removed, as it was so completely degenerated that it was obviously no longer a functioning organ. Whether or not the parathyroids had taken up the work of the thyroid, he could not say, but he hoped she would not have any cachexia at all.

DISCUSSION.

DR. EINHORN said that the symptoms of myxoedema generally appear if there is no thyroid gland to perform its function. If there were to be symptoms of myxoedema or cachexia, they should appear soon after the removal of the gland, not a year or two later.

Sub-Glottic Neoplasm. Presented by DR. SIMPSON for a non-member of the Section.

Dr. Simpson said that Dr. Dishrow had kindly brought this patient for examination, as it was a rather unusual condition. He would advise those who had not seen the case to come forward and examine it, for it showed remarkably well. It was a case of sub-glottic tumor, presumably a papilloma of the vocal cord, in the anterior commissure. It shows remarkably well on both inspiration and expiration, and when thrown into the glottic space, it fills it very well. The patient is 48 years of age and has noticed the hoarseness for a year. Bearing upon the etiology, the patient had pneumonia 11 years ago. Mother died at 45 of dropsy. Father died from a fall. No specific history. The question now is whether the growth is malignant or benign. The chances are that it is benign.

DISCUSSION.

DR. HARRIS inquired whether he had understood Dr. Simpson to say that these sub-glottic tumors were rare.

DR. SIMPSON replied that he had used the term sub-glottic with reference to the location of the tumor, and that we should be careful in using the term sub-glottic. He was not sure that the origin of the growth was below the cord, but the growth itself was below, possibly because of its dependent character. The origin was very close to the anterior insertion of the right cord. The term "sub-glottic" should be used only to indicate the sub-glottic origin of a growth.

Traumatic Fistula through the Cribriform Plate of the Ethmoid Bone, By HARMON SMITH, M.D.

Dr. Harmon Smith presented an X-ray plate or photographic demonstration of a fistula through the cribriform plate of the ethmoid, with the probe in situ, the fistula being the result of an accident.

A girl aged 4 years had fallen from a third story window 18 months previous to presentation at the clinic. She had had a depressed fracture of the frontal bone over the left eye, which had been removed at the time of the accident. She had recovered from the immediate injury, but a quantity of clear fluid continued to flow from both sides of the nose, with intervals of cessation for a day or two about every month. Each cessation resulted in a convulsion, and after the convulsion the discharge would return.

The mother first consulted Dr. Haskin relative to a discharging ear, during the routine examination for which he noticed a polyp or

large piece of granulation tissue in the right nostril, and referred the case to the throat and nose department of the hospital. In the absence of Dr. Chappell, to whose clinic the case was referred, the polyp was removed by Dr. Smith. This action was immediately followed by a gush of thin fluid. A necrotic condition of the turbinate was also noticed. Upon probing to ascertain the extent of the disease, a fistula was found leading up through the cribriform plate. The probe entered the cranial cavity, and was only stopped by the curvature of the skull. A skiagraph was made with the probe in situ. In addition to showing the position of the probe, the plate also demonstrates a purulent sinusitis of the ethmoids and antrum on that side.

Before further observation could be made, the patient developed pneumonia and died. The parents refused an autopsy, and thus we can only conjecture that there had been a fracture of the cribriform plate followed by a fistula constantly leaking cerebro-spinal fluid, and that the probe entered the cranial cavity between the two frontal lobes of the brain, anterior to the corpus callosum.

DISCUSSION.

DR. FREUDENTHAL inquired whether the cerebro-spinal fluid had been examined. Some years ago he had reported a case of discharge of the cerebro spinal fluid, and it was suggested that there were perforations through the cribriform plate. The woman is still alive and has felt perfectly well for the last year or so.

DR. SMITH replied that neither microscopic nor chemical examination of the fluid had been made, but that the quantity of fluid and its point of exit were almost sufficient evidence of its being cerebro-spinal rather than mucous.

DR. THURBER said he thought that a diagnosis of perforation might be made. Some years ago a patient came to the Presbyterian Dispensary with a history of having fallen and run the rib of an umbrella in his nose, and there was a constant flow of thin watery fluid running from the nose. He would not, however, remain in the hospital for treatment. Two days later he was admitted and died of meningitis. An autopsy revealed perforation of the cribriform plate.

DR. SMITH said that he had seen several cases of cerebro-spinal rhinorrhoea, and that the quantity of fluid lost had always been excessive.

Primary Tumor of the Trachea. Extirpation. Presented by
EMIL MAYER, M.D., for C. A. ELSBERG, M.D.

This little girl, now 9 years old, was brought to Dr. Mayer's service at the Mt. Sinai Hospital, in the out-patient department, with the statement that she had been suffering from dyspnoea for over a year, and the general belief was that it was a case of congenital stridor. There never had been cyanosis.

It had required a great amount of patience to examine the child; but the reward was also there, for the view of the Larynx showed a sub-glottic tumor to be present, about on a line with the fourth tracheal ring; its base was broad and no pedicle could be seen.

Endo-laryngeal operation was not to be thought of, as it was barely possible to get a view of the Larynx and instruments would not be tolerated even if the growth were higher up and more readily reached.

The attending physician then referred the child to Dr. Elsberg, at Mt. Sinai Hospital, who performed a tracheotomy, and removed a tumor which was an inch and a half long, friable, and extended from the fourth tracheal ring downwards. It had no pedicle and was broadest at its uppermost portion. The recovery was without untoward symptoms.

Subsequently the breathing became bad again and it was feared that there was a recurrence. The trachea was again opened and some granulation tissue found; no recurrence.

The pathologist's report was that it was a fibroma.

An interesting point was brought out by Dr. Elsberg in reference to anesthesia in this class of patients.

The walls of the trachea are apt to become flaccid in the narcosis and in cases of this kind it is vitally necessary to be prepared to perform a hasty tracheotomy. All preparations for operation were made, the operator and assistants were all ready before the anesthesia was begun. Asphyxia promptly supervened and rapid tracheotomy had to be performed. Without these precautions her life might have been lost.

Another point of interest is the extreme rarity of this class of tumors. In a recent paper Theisen of Albany gathered the histories of cases of tumors of the larynx in the literature of the world and found in all but 86 cases of tracheal tumors. Of the cases of fibroid tumor in young children this case was the fourth recorded.

The speaker congratulated Dr. Elsberg on the very favorable result. He also took pleasure in his own diagnosis of tumor in a young child, difficult to examine, and all in the work of a busy clinic.

DISCUSSION.

DR. SIMPSON inquired whether the voice was interfered with before the operation.

DR. MAYER replied that the voice was not affected, but that the breathing was seriously obstructed.

DR. SIMPSON rejoined that that was a diagnostic point in subglottic tumors. Unless it is so large as to obscure everything, the voice remains good.

DR. QUINLAN inquired whether a high or low tracheotomy had been performed, and also wished to know how long the tube remained in situ.

DR. MAYER responded that a low tracheotomy was performed, and that the tube remained in place not over a week or ten days.

A New Method of Operating upon Turbinal Hypertrophies, with Demonstration of Instruments, and of the Technique upon a Manikin. By SIDNEY YANKAUER, M.D. (*Published in full in THE LARYNGOSCOPE, page 105, Vol. XVII, No. 2.*)

DISCUSSION.

DR. EMIL MAYER felt that the Section was to be congratulated on having something entirely new presented before it. It was by no means the first time that original work had its first public notice through the Section, and hence the feeling of satisfaction that the speaker had in seeing this new work brought to public notice in this way.

When Dr. Yankauer first proposed to suture deep in the nose the speaker felt that it would either be impossible or one of the very difficult things to do. All of the cases here recorded by the reader of the paper had been seen by Dr. Mayer and referred by him for operation, and the subsequent results noted, and these were remarkable. Where formerly weeks were required for healing, a few days were all that seemed necessary.

The speaker had operated in the manner here proposed twice. The first case was a young girl with a synechia and by cutting away a portion of the mucous membrane and suturing, a free channel remained and healing was unusually rapid.

The second case was that of a physician from whom a portion of the left turbinate was removed with a snare with much bleeding then and with removal of first dressing, healing at end of six weeks.

The second operation was done on the right side. Dr. Mayer saw him twice afterward, once to remove dressing 24 hours after operation, and the second time when after some urging, the man presented himself at the end of the second week, when the wound was entirely healed. It seemed very easy to see Dr. Yankauer tie these sutures, but it required some little practice to acquire the technique. However, when this was learned, in a very short time the operation could be done as easily as say a submucous resection, which every one here feels qualified to perform. The matter of suture did not end with the operation upon the turbinate, but was particularly adapted to closing perforations of the septum, and much relief could thus be afforded to those who were otherwise doomed to much annoyance all their days. The method would become more and more useful and would doubtless be widely used, and probably some of those present might be able to make suggestions which would improve the technique and render it even more valuable. Dr. Mayer said that he was convinced that in this method we have a procedure which will prove of great service in our intranasal work.

DR. MYLES said that he could not let such a remarkable paper pass without expressing his approval. Dr. Yankauer has in this method solved many of the problems upon which light has long been wanted. For years he himself had been trying to sew the tissues on the middle and posterior parts of the septum, and had tried Rowe's needle, but with little success. He had occasionally put a stitch in the synechia, but had never been able to sew up a wound. As Dr. Yankauer presented the case, it seemed feasible in selected cases, and one that all should attempt. He had demonstrated it very clearly. In regard to one point where Dr. Yankauer said the technique was still defective—the proper instrument for the removal of the segment of tissue after making the second incision with the knife, he himself had recently constructed an automatic pair of scissors which will probably serve this purpose very well. So far he had found it as satisfactory as he could wish. There was a small lever at the end, and one could see at any time what he was cutting. They did not slide or slip, but cut just as desired. Some kind of instrument would soon be devised for cutting off the bone. Sometimes this was sawed, sometimes taken off with a punch, chisel or scissors. He wished again to express his appreciation of Dr. Yankauer's work, for it was what all had felt the need of.

DR. COFFIN said that this work showed so much sincere and honest work that he felt the Section should go out of its usual routine and express a vote of thanks to Dr. Yankauer.

Motion was made and carried.

Bronchoscopy, Esophagoscopy and Gastroscopy, with Report of Cases. By CHEVALIER JACKSON, M.D.

The paper was an exhaustive treatment of the subject, and was accompanied by a demonstration of the instruments, lantern slides, color drawings, X-ray plates, skiagraphs and specimens.

He reported five cases of foreign body in the bronchi, two removed by upper and one by lower bronchoscopy, and two not removed; all the patients recovering. He had had six cases of foreign bodies in the trachea, two removed by upper tracheoscopy, and four (that came in breathing badly), by lower tracheoscopy. Of foreign bodies in the esophagus he had seen 12, all removed but one, which required celiotomy, but which with his present perfected instruments he was certain could be removed by endoscopic methods. He had removed one foreign body from the stomach by gastroscopy. He had removed 31 foreign bodies from the larynx by direct laryngoscopy. His cases of endoscopy in diseased conditions included bronchoscopy 4, tracheoscopy 18, esophagoscopy 34, direct laryngoscopy 28.

Dr. Jackson then gave the results of his original work in gastroscopy. He referred to the attempts of Mikulicz and Rosenheim to examine the stomach, attempts which were unsuccessful practically, because of imperfect instruments, modeled after the Nitze cystoscope. He said that gastroscopy was not simply a feat but had a definite field of usefulness. Malignant disease could be discovered sufficiently early to give the surgeon a fair chance, or still better, precancerous conditions could be discovered in the curable stage. Many other pathologic conditions as inflammation, ulceration, scars, neoplasms, dilated vessels could be diagnosticated by direct inspection. Ulcers could be treated and foreign bodies removed.

He had been able to explore about two-thirds of the interior of the stomach and felt sure that the unexplorable area would soon be reduced below one-third. In one instance he had explored the entire stomach.

Dr. Jackson reported in detail 14 cases in which he had positive findings. In most of the cases the lesions were plainly seen by other physicians not accustomed to tubular work.

The positive findings were as follows, some of the patients having more than one condition:

Chronic gastritis	2 cases
Gastropotosis	2 cases
Malignant, cardia	2 cases
Malignant, pylorus	3 cases
(Specimen taken in two instances).....	
Peptic ulcer	5 cases
Peptic ulcer cured (?).....	1 case
Negative results of value.....	1 case
Foreign body removed.....	1 case
Gastric syphilis	1 case

In no case had any harm resulted, and with careful attention to details of technic, he thought the only dangers were those of ether anesthesia.

DISCUSSION.

DR. WYETH regretted that unavoidable delay prevented him from hearing all of the paper of the evening, which would prevent him from discussing it intelligently, and that owing to the lateness of the hour, there was really not time to give such a satisfactory and useful demonstration the attention it deserved. The lower oesophagus was the "via dolorosa" of the surgeon, and anything which would throw light upon the mediastinal portions of this tube must rank as a valuable contribution to practical surgery.

DR. BOYCE: It might be well to say a few words on the gastro-scope as a practical clinical instrument. There are a number of theoretical objections which suggest themselves to anyone. In the first place, from the ill success which has attended former effort at gastroscopy it might be supposed that the passage of the instrument would prove too difficult for anyone but a laryngologist. In the occasional case that justified its use therefore, we should have the tube passed by a man entirely ignorant of stomach troubles, and therefore unable to balance the history of the case against the picture he sees in the tube. With him, we should have a man who has seldom viewed the gastric mucous membrane in the living, and who is possibly unable to focus his eye through an 80 c. m. tube. When so passed, the proceeding seems dangerous. In cases of gastric ulcer, we pass the soft rubber stomach tube gingerly and with hesitation barely through the cardiac orifice. It would therefore seem inadmissible to ram a small sized shotgun into our patient's abdomen, as though we were gunning for internal piles, unless we could positively exclude gastric ulcers.

Now we never can positively exclude gastric ulcer, for nearly a quarter of all cases are absolutely latent as regards symptoms. In the third place it might be thought that the inspection would be seldom called for. Gastrologists are already the envy of all other *varieties* of clinicians for the certainty and precision of their diagnosis. In the fourth place, the examination can never be complete and satisfactory, for certain areas of the stomach cannot be viewed through this tube. When you have done your best (or your worst) with the gastroscope, and have seen only the pale relaxed membrane of neurasthenia or the congestion and thickening of alcoholic gastritis, you can not be certain that there was not an ulcer or a cancer along the greater curvature.

All these objections seemed to me at one time perfectly sound. If I had been the original man from Missouri I could not have attended my first gastroscopy in a less sympathetic attitude. Of them all, one and one only, has survived actual knowledge of the instrument. There is an area that cannot be brought opposite the end of a gastroscope of the Jackson pattern. This area is smaller than you would suppose if you are still bound by text book pictures of the shape and position of the stomach in cadavers that have hardened in the horizontal position. It will grow smaller with wider practice in external manipulations. But it still remains, and Dr. Jackson must admit it as one of the limitations of his method. That it only limits and does not destroy its usefulness is shown by the fact that the same consideration, "Negative findings are not decisive," applies to nearly all of our diagnostic technique. It applies to the Widal test, to the sputum stain; to that very useful measure, the lumbar puncture; it applies to the physical examination of the chest of infancy and to the ophthalmoscope in brain disease. Yet we do not excuse the clinician who deliberately remains ignorant of any of these measures. No other objection stands the actual trial. The difficulties are considerable but their field ends at the cricoid cartilage. It is not harder to pass a straight rigid tube into the stomach than to the mid-oesophagus. In the presence of Dr. Einhorn I do not feel called on to argue that the difficulties outweigh the advantages. As to the danger, we must not overlook the fact that once the cricoid is passed the obdurator is removed, the light turned on and every subsequent step is in plain sight. If there be dangers they lie not in the operation but in the operator. The instrument itself is scarcely more dangerous than the soft rubber tube passed in the dark; not so dangerous as the oesophageal bougie, infinitely less dangerous than the gyro-mele.

As to the sufficiency of present methods in gastric diagnosis, it is only from the relative viewpoint that gastrologists can plume themselves; absolutely their knowledge is still very imperfect. As scientists they can as little as any of us afford to neglect any additions to their armamentarium. They can distinguish with wonderful precision between one organic lesion and another. But to distinguish purely functional lesions from organic they must rely on these so-called intuitions, which, however accurate they may be in the hands of the men of large experience, however useful to us as practitioners, belong yet to the art rather than the science of medicine. Already Dr. Einhorn looks within the cardia. Tomorrow he will lengthen his tube and work step by step down to the very bottom of the greater curvature, gaining enthusiasm at every step. Ten years from now the stomach specialist will be as unwilling to do without the scope as the laryngologist would be to dispense with the throat mirror. Perhaps by the time I next have opportunity of addressing the New York Academy of Medicine I shall admonish it with trembling forefinger and in the quavering voice of age remark that the gastroscope isn't everything; that it does not replace brains or care or experience; that a self-sufficient generation relying on it exclusively has lost that wonderful clinical insight and that success in treatment that distinguished Hayes and Einhorn and the other giants that existed in my day.

DR. ELSBERG said that he had had no experience at all in this kind of work and could only speak as an admirer of the work that had been done by Dr. Jackson. He did not think, however, that full success could be expected in gastroscopic work until the entire stomach could be examined, as the bladder can now be examined by the cystoscope. Cases where we have negative findings are just the ones where the gastroscope is really needed. He had had some experience with the oesophagoscope, and had first seen this work in Breslau about eleven or twelve years ago. Since that time, he had used the oesophagoscope frequently, and did not find the introduction of the instrument difficult if proper care was taken, and no force used, as Dr. Jackson had said of all instruments, whether introduced into the trachea, oesophagus, or stomach. Unless the instrument is pointed in the wrong direction, the tendency is to enter easily. If you have the patient in the right position and pass the finger into the mouth, whether anaesthetized or cocainized, and pull forward the epiglottis and base of the tongue, there is very little trouble. He agreed with Dr. Jackson that the correct manner of examining the

oesophagus is with the eye, passing the instrument gently downward and watching carefully. In this way he had been able to recognize neoplasms and cardiaspasm, and had removed quite a number of foreign bodies from the oesophagus—pins, etc.

When Killian first described the bronchoscope, the subject was brought to his attention by Dr. Yankauer and Dr. Mayer and he had been much interested in this branch of work. Surgeons had in the past occasionally examined the trachea and bronchi through a tube passed through a tracheotomy wound, so that the idea was not entirely new; but in the majority of cases in an attempt to extract a foreign body they made a tracheotomy wound and fished in the dark with forceps to try and capture the foreign body, sometimes succeeding and sometimes failing, but always causing more or less trauma of the mucous membrane. During the past year he had had three cases of foreign body in the bronchi—two in the right bronchus and one in the left—which had been successfully removed. One was a turkey bone which had been in the right bronchus for six months.

DR. EINHORN said that all present must feel very grateful to Dr. Jackson for his very careful and fine illustration of the subject and for the demonstration of the instruments. In regard to the gastroscope, he had only a few words to say. He had never had occasion to extract foreign bodies from the oesophagus, but had had occasion to inspect malignant growths in that region and had usually made the diagnosis of malignant tumor, and had seen pictures similar to those shown by Dr. Jackson. He had also had two cases in which the symptoms pointed to some severe lesion, the patients not being able to eat and losing from 40 to 50 pounds in weight. Upon examination with the bougie, he had not been able to discover the trouble, but with the oesophagoscope erosions were found at different spots and it was inferred that it must have been a contraction or something of the sort which caused them to avoid eating, and these patients were entirely cured in a short time, on account of the knowledge gained with the instrument. He usually introduces the instrument with the patient in a sitting posture, and ordinarily without anaesthesia of any kind. He had also had the idea of constructing a longer instrument with which to look into the stomach without the aid of anaesthesia, but found that this was very disagreeable to the patient. He was convinced, however, that with anaesthesia the gastroscope can be introduced very easily, and he had found it a very useful instrument. He could not say that he felt we know as much about the stomach as Dr. Boyce had suggested, for there is much in-

formation yet to be acquired. He often felt in doubt as to whether there was beginning malignancy. He might think a case was malignant, but could not be positive. It would be a great gain if one could inspect the entire stomach. Dr. Jackson's instrument had the disadvantage that only a small portion can be inspected at one time—the area which is opposite the opening, while with the others a larger area can be seen. About 17 years ago he had tried to introduce Mikulicz's instrument and succeeded, but the patient had some difficulty in swallowing for two or three days. If, however, patients are examined under anaesthesia, they will not suffer so much afterward. He certainly intended to try Dr. Jackson's instrument as soon as it was feasible to do so.

DR. HAYES said he also felt deeply indebted to Dr. Jackson for the paper. The main point for consideration is the danger of using the gastroscope in the stomach. The only times when it is particularly needed are in cases of ulcer and malignant disease, and in these cases the lesion is most apt to be found in the region of pylorus or lesser curvature. In such cases the dragging or pulling on the stomach to bring the pylorus into the field of vision involves great risk, and consequently this direct view is hardly available where it is most desirable. If Dr. Jackson could so modify the instrument as to secure a good view of the pylorus and lesser curvature without this forcible manipulation, it would be a great step in advance.

DR. HUBER said that he had been particularly interested in Dr. Jackson's case of enlarged Thymus, in view of the experience of some of our German colleagues. Ranke and several others in some very severe cases due to large thymus glands have cut down and brought the gland forward and have relaxed the pressure without the necessity of tracheotomy and subsequent enucleation. There is a small heart, small vessels, and a large number of enlarged glands—all essentials in the condition to which the term status lymphaticus has been applied, and if a much less serious operation will serve the purpose it must be better than the more serious method. He had also been much interested in the subject of foreign bodies from the standpoint of the general practitioner who has often been called upon to make a diagnosis of abscess of the lung or gangrene months after a foreign body has been inspired, and where there was no history of such an etiological factor. He told of two cases in which after eliminating every other possible cause, such as bone trouble, septic processes, etc., he was forced to the conclusion that there must be a foreign body. Examination with the X-ray proved this to be the case,

and the child, $2\frac{1}{2}$ years of age, was put under chloroform and a low tracheotomy was performed. In this case there was a large thymus, which was anchored anteriorly and so kept out of the way while the trachea was incised. Then with the help of an ordinary Gill Wylie uterine packer, the suggestion of Dr. H. M. Silver, as a bronchoscope, and a very delicate lamp used in urethral work, he was able to see a black speck low down on the right bronchus. This was seized and proved to be a nail two inches long, which was easily removed. This had given rise to a large abscess involving the upper and middle lobe of the right lung, and had been in situ for 8 months. The child recovered very nicely. The tube remained in for a few days, but there is still a large abscess which is contracting. He had an X-ray plate showing the nail embedded in the lung.

An Additional Turbinated Bone Situated below the Lower Turbinated. ERNST URBANTSCHITSCH. *Monatschr. f. Ohrenh.*, Berlin, October, 1904.

The author found a structure resembling the turbinated bones, situated below the lower turbinate. It consisted of a shelf of bone covered by mucous membrane containing erectile tissue. The structure was present on both sides. It was found in two cases, mother and son, and the author considers it a congenital malformation, resulting from an anomalous development of the intermaxillary bone.

YANKAUER.

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ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding
that they are contributed exclusively to THE LARYNGOSCOPE.)

EDITORIAL.

THE NUMEROUS OPERATIVE METHODS FOR NASO- PHARYNGEAL ADENOIDS.

It is clear to all who are acquainted with the many publications of the operative methods for naso-pharyngeal "adenoids," that no one of them has yet been agreed upon as the one of general choice. The curette is the favorite instrument, and the supine position with the head hanging generally preferred. The curette varies in shape and size *ad infinitum*.

The forceps has many advocates, its use, however, being restricted owing to the greater skill requisite for a thorough removal and the uncertainty in the minds of many as to their ability to avoid injury to the vomer.

With either instrument, the operator too often "goes it blind."

There can be no doubt, (as proved by literature), that secondary hemorrhage when it occurs, almost always follows the use of the curette; partly the result of a sharp-cutting blade which does not follow the varying contour of the vault, and partly because of the portions of the adenoid tissue left hanging at the lower part of the vault, especially when the instrument is dull. Dr. W. A. Martin of San Francisco has pretty well eliminated the latter result by the invention of his post-nasal curette forceps¹, an instrument which the writer has seen Dr. Martin use skilfully and quickly, and which he has satisfied himself by careful digital examination and post-operative observation of the patient, thoroughly bites off the mass owing

¹ THE LARYNGOSCOPE, p. 117, vol. ix., Aug. 1900.

to the anterior curette branch being met, on the closure of the instrument, by the posterior branch, where the adenoid mass joins the loose mucous membrane low down in the vault.

Interesting questions are: Why this great variation in instrumentation and method? and, What are the most common-sense instruments and methods?

Perhaps we can arrive at some understanding by trying to answer another question, viz: Supposing the naso-pharyngeal vault were exposed freely to view, no palate obscuring it; how should we remove the adenoid mass?

Probably most operators would seize it with some suitable grasping forceps and deliberately dissect it out with scissors, and use a small curette to scrape out the lateral portions anterior to Rosenmüller's fossae, which are not attached to the median fibrous "placenta."

As, however, the palate *is* in the way, how can we approximate such an ideal procedure? It must be borne in mind that too often free respiration is not secured because of failure to remove portions of the growth which, by the methods in vogue, are crowded into the choanae. This occurs far oftener than is supposed. Ingals of Chicago cuts off these portions with forceps introduced anteriorly through the nasal fossae, and Freer² attacks the growth with his "pernasal forceps" solely from the nasal fossæ, the left forefinger being passed above the palate to guide the instrument. However, by placing the patient semi-prone on his right side, the operator can first pass his left forefinger above the palate and against the vomer, and then guide a strong, sharp forceps (such as French's), along the dorsum of the finger without fear of grasping the vomer. This is not "going it blind," and is a method used with great success by not a few operators.

EATON.

² *Ann. Otol., Rhinol. and Laryng.*, Dec. 1906.

THE SYSTEMATIC EXAMINATION OF SCHOOL CHILDREN FOR DEFECTS OF HEARING.

The examination of school children for errors of refraction has become an established routine in a number of cities and has given such excellent results that it should be universally adopted. It not

only demonstrates the fact that many children suffer from headaches and various disturbances of the nervous system on account of myopia, hyperopia and the various forms of astigmatism, but also that the aversion that many children have to study is due to some unsuspected error of refraction, creating difficulties in seeing letters and words, and, in many cases, making the vision for near work quite imperfect.

An analogous condition of affairs exists in the function of hearing. Every aurist realizes how far the hearing, especially in children, may be impaired without this being suspected, and also that when parents bring their children to the clinic or office for defective hearing, it is usually only after this function is markedly impaired.

The reasons usually given for neglecting such cases is that the child was supposed to be inattentive or, in some cases even, dull, and there is no doubt that a large number of school children with defective hearing are placed by their teachers and family in this category.

The reason for this is that the capacity of hearing may be considerably heightened by the effort of listening. When, therefore, the attention of the child is first attracted, it appears to hear fairly well. Like other forced efforts, however, this soon becomes fatiguing, and the hearing relaxes. The child is then called inattentive or dull, the real cause frequently being unsuspected.

By having a systematic method of testing the hearing of school children by an experienced physician, this defect of hearing is easily detected. If any defect is found the teacher is informed, who, in turn, notifies the parents. In this way many affections of the ear are discovered in their incipiency and at a time when treatment gives the best results. The health and disposition of the pupil is benefited and he is placed on a fair competitive basis with other children in the acquisition of knowledge.

This matter should, therefore, be taken up by physicians in general and its importance brought to the attention of the school authorities. By proper attention to this matter, many little scholars who are now considered dull, listless or inattentive, and a source of worry to their teachers may, by improving the hearing, be found among the most bright and promising pupils.

SCHEPPEGRELL.

THE IMPORTANCE OF AN EARLY DIAGNOSIS OF MALIGNANCY OF THE LARYNX.*

By OTTO J. STEIN, M.D., CHICAGO.

My remarks are not intended as a contribution of anything new, but are merely the expressions of an humble worker and observer in the field of laryngology, who seeks for a unification of opinion upon a method of procedure in case of malignant growths of the interior of the larynx, as well as to emphasize the necessity for their early recognition.

At the present time there exists a curious anomaly of opinion within the laryngological world relative to the mode of procedure in the presence of an intralaryngeal malignancy; and some of these contentions are at such variance with the usually accepted pathology of this disease that one wonders how they obtain.

In the light of our present knowledge and the early diagnosis, early radical removal of a cancer is the most successful means we have at our command to determine a cure. This truism applies to cancer of the larynx as elsewhere.

Ever since the discovery of the anaesthetizing effects of cocaine, it has been the effort of laryngology to teach the endolaryngeal route for removal of all neoplasms situated within the larynx. This method of teaching applied to malignant as well as to benign growths was fostered by the belief that all neoplasms of the interior of the larynx were accessible by the natural passage, and owing to scant lymphatic connections and a limiting cartilaginous band, all offensive neoplasms within the larynx remained confined for a protracted period. Today the question is asked, "Is it true that all neoplasms of the interior of the larynx are accessible endolaryngeally?" The experiences of the past twenty-five years do not prove the assertion. In making this statement one cannot be unmindful of the admirable skill and ingenuity exhibited by many of our brilliant laryngologists in the removal of malignant tissue from the larynx; and there undoubtedly exist isolated cases where the entire growth has been removed and no recurrence has taken place or complications set in. But they constitute by far the minority of the cases operated upon by this method. The conscientious worker in this field of laryngology, the man who is a close observer and who follows all cases coming under his observation

* Read before the Eleventh Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology, St. Clair, Mich., August 30, 31 and September 1, 1906.

throughout their course, can show that recurrences are common after endolaryngeal removal, which is mainly due to an inability to at all times appreciate the extent of the lesion by mirror examination alone, and as a result the operation is incomplete. It has repeatedly been shown on opening a larynx that the malignant process involved a much greater extent of tissue than appeared from a study of the case with the mirror. In order that laryngology may maintain a position in the front rank as practical surgery, much of the teaching and practice as outlined in the standard text-books on this subject must be rewritten. The experiences of some surgeons who have had a large amount of material to work with and who are students of this art and close observers, disclose many remarkable revelations in the results obtained by early and radical removal of involved tissue by the external method of operating.

The endolaryngists who, in view of our present knowledge, keep themselves so closely confined within the border lines of conservatism by maintaining that malignant processes within the larynx should be removed by way of the mouth, are not subserving the best interests of their patients, and are directing the newer generation of workers in a field that is fast casting opprobrium upon the treatment of laryngeal cancer.

It is a primordial principle of surgical pathology that when an attempt is made to remove a malignant growth, one should circumscribe all morbid tissue by invading the surrounding healthy tissue, and remove any enlarged neighboring lymphatic glands. This can be done with greater certainty and thoroughness by the external route. That it cannot always be done endolaryngeally must be admitted by every fair-minded laryngologist. If reliable statistics of all cases operated on endolaryngeally could be obtained, I doubt if they would make even as good a showing as the thirty-two cases by Sendziak, in which there were 40.7% known relapses and 34.3% not accounted for. Then, why, in the face of this axiomatic truth, should any one persist in the effort to remove malignant tissues from within the larynx by any other than the external route, when there is such uncertainty of reaching it all, and where there is a decided likelihood of a recurrence, usually in an aggravated form?

Krishaber's classification of malignant growths of the larynx is a useful one in influencing the selection of operative procedure. He designated those tumors originating from the true and the false cords, the ventricles and the subglottic space, as "intrinsic,"

and those originating from the interarytenoid space, the oesophageal side of the larynx, the epiglottis and the aryepiglottic fold, as "extrinsic." Malignant tumors of the latter variety have associated an early and extensive involvement of the neighboring lymphatics, and on this account more frequently present metastases, and they also require more extensive radical operative procedure than the "intrinsic" variety, in which the disease at the beginning remains a local one, owing to its location within a cartilaginous box, from which the intrinsic lymphatics have a poor connection with the neighboring glands in the neck. Because of the local character of all purely intrinsic malignant tumors at the beginning, a most excellent prognosis can be entertained when immediate and complete removal of the growth is proceeded with by way of a thyrotomy. Where secondaries have already occurred by way of the lymphatics or by direct continuity, then the operation should be carried on to hemi or complete laryngectomy, with removal of all neighboring glands, whether involved or not. But wherever these secondaries have occurred, or the disease is primarily of the "extrinsic" variety, the prognosis becomes much graver and the likelihood of recurrence much greater.

Of the various external methods of operating, that of thyrotomy is the simplest and most satisfactory if it is confined to the early cases, while the disease is still local and especially unilateral no involvement of the underlying cartilage. Otherwise partial or complete laryngectomy, as occasion may require, should be proceeded with at once. A perfect understanding with the patient as to this should be had prior to the operation, for it involves a medico-legal aspect in which a surgeon may be held liable for venturing to do what was not anticipated or what was not presented to the patient as a possibility.

Aside from the partial and complete laryngectomies, the subhyoid pharyngotomy after Kocher is at times performed, but it is not an operation suitable for any of the intrinsic variety, for frequently there is present subglottic involvement that cannot be seen or removed in this manner, and therefore the operation should be rejected as one of election. Von Billroth operated on a case in which the incision was made transversely in the upper third of the thyroid cartilage, admitting direct inspection of the ventricle; but I cannot see any advantage in this method, while it possesses the same disadvantages that the subhyoid pharyngotomy does.

That many of the cases of intrinsic cancer are favorable for thyrotomy is nicely shown by the figures of Sendziak, in which

the location of the disease was on the true or false cords in 130 out of 486 cases.

Several earnest workers have appeared in this particular field of laryngology, including Bruns, Moure, Butlin, Semon, Jackson, etc. But one of the most prolific and infectious writers on the subject is Sir Felix Semon. In one of his communications on this subject (the 71st Annual Meeting of the British Medical Association, 1903), he showed out of eighteen thyrotomies performed for early intrinsic malignancy of the larynx, microscopic verifications having been made in all cases, fifteen, or 85%, were cured. A year later, in an address delivered before the New York Academy of Medicine, he refers to twenty thyrotomies performed and seventeen lasting cures. In a conversation with him during my visit to London this summer, he related that the number of these cases had been doubled, and that the percentage of cures still remained at 85%. I think we will search in vain the entire domain of surgical statistics to find the parallel of these wonderful results for any malignant condition. In order to secure these "perfectly ideal" results, Semon considers the following conditions essential:

"The operation must be restricted to early stages of intrinsic malignant disease.

"For this purpose an early diagnosis is indispensable.

"The operation must be thorough; removing a sufficient area of healthy tissue around the growth."

Should the larynx, when opened, disclose the disease more extensive and advanced than supposed, such operative procedure should be indulged in as to entirely eradicate all evidences of the disease, even if a partial or complete laryngectomy must be performed.

From this it is to be seen that it is in the very early stage of an intrinsic malignant process that the great benefit from any operative treatment is to be obtained. The disease once well established precludes almost every chance of saving such a patient's life, while, on the contrary, if recognized and operated on at the very beginning, almost every such life can be saved. The keynote to the situation, then, is early recognition and the education of the public mind to early radical removal.

Laryngeal cancer has its ideal, like many other things, but if we are to wait for the development of this ideal it will be too late to do anything in the way of curative treatment. The diagnosis, to be of any value to the patient, must be made early, and this re-

quires a careful study of all suspicious laryngeal cases. Because there is an absence of the well-defined symptoms, as seen in the advanced cases, or extensively involved areas, is no reason why one should abandon his watchfulness. Just because the patient manifests no characteristic cachexia, or has no dyspnoea or foetid breath, blood-stained expectoration, or even hemorrhages, or pain referred to the ears, particularly on swallowing, does not justify one in dismissing the consideration of the possibility of a malignancy. To wait for these classical symptoms—these textbook symptoms—is to throw away, in many cases, the last hope of saving one's patient. Where the condition has progressed to such an extent as to cause glandular involvement, enlargement of the neck, and emaciation, it has passed the confines of curability by means of thyrotomy.

In a careful perusal of the history of a great number of recorded cases of laryngeal cancer, one cannot help but be impressed by the almost invariable presence of hoarseness as the earliest noticeable symptom. But on account of the frequency of hoarseness as a symptom of many varieties of laryngeal disease, its significance is liable to suffer from want of absolute recognition until all too late, and as a result the comfort, the happiness, the health and finally the life of the patient is sacrificed. But if we will take what material we have on hand in such cases and commence a series of thorough and painstaking searches for a cause, we shall arrive at a correct diagnosis much earlier than if we dismiss the case for want of sufficient evidence, or by treating it for a "cold," or just a "chronic hoarseness." The diagnosis of a case of "chronic hoarseness" necessitates a differentiation from a possible variety of conditions. Particularly is this true where no distinct lesion or growth is to be seen. The hoarseness, the result of a beginning malignancy, may result in one case from incomplete apposition of the vocal cords on phonation, owing to the situation of a neoplasm or infiltrate along the margin. In another case, it may result from the infiltration impeding the motion of the cord, so that it cannot approach sufficiently near its fellow. Still, in another case, the cord may meet its fellow and even approximate along its margin, but, owing to the thickening, it is robbed of its finer vibration. In a few of the early cases, deep-seated growths or enlarged glands may inhibit the action of the cord by pressure on the recurrent nerve. Every case of chronic hoarseness for which no definite cause can be determined should be placed under the closest surveillance and subjected to repeated examinations at

frequent intervals. At the same time the confidence and support of the patient should be enlisted in every way possible.

One of the strongest clinical evidences of malignant involvement I have found to be infiltration. An infiltration that persists without an apparent reason I consider suspicious, and advise careful observation of the same. The infiltration is not pathognomonic, nor has it any characteristic appearance. Most of those that have come under my eyes have had the appearance of being firm in consistency; but this does not at all times obtain, for there are varieties of malignancy that are soft or succulent-like, much resembling a turgescence. Many of these infiltrations have no sharp line of demarcation, but blend imperceptibly with the surrounding structures. Their overlying mucous membrane may or may not be changed in appearance, depending much upon the starting point of the disease, the variety of the malignancy, its rapidity of growth, the age and general condition of the patient. At times, the infiltration originates deeply or in recesses like the ventricle, or is hidden from observation by the cords, so that its early recognition becomes impossible, but on account of the pressure it may exert upon a branch of the motor nerve, or by direct encroachment upon intrinsic muscles, there is seen a lazy action of the vocal cord. This sign of "lagging" on the part of a cord during an attempt at phonation, when associated with chronic hoarseness, should always arouse suspicion and awaken watchfulness. Gerhardt considers a chronic hoarseness in middle or old age, and without cough, as suspicious.

The color of these neoplasms varies so, according to their variety and other conditions, that no characteristic description can be given. The opaque or chalk-white kind are more characteristic of the epithelial variety found on the vocal cords. The reddish or yellowish ones are frequently of the diffuse variety on the vocal cords. The grayish color is often the accompaniment of the diffuse cauliflower form that arises from the bands, the ventricle, or wall of the larynx. The color of the sarcomas is more commonly light yellowish and the surface is smooth. Fraenkel's classification of carcinoma of the larynx as modified by Moritz Schmidt is an excellent guide to a clear understanding of the various varieties. The *first* is the polypoid form on the vocal cord, often resembling a fibroma. The *second* is the diffuse form on the vocal cords, presenting a thickened, irregular or nodular surface. The *third* is either of the above forms, or a combination of the two, situated elsewhere than on the vocal cords, and resembles more

often a cauliflower-like growth. The *fourth* is the ventricular form. The *fifth* is that form the origin of which is deep-seated.

The diagnosis embraces at times the consideration of tuberculosis and syphilis of the larynx, chronic laryngitis, pachyderma laryngis, various benign growths, gouty deposits and laryngeal paralysis. In my experience, the presence of a tubercular lesion of the larynx has more often made the diagnosis difficult and uncertain. In a large number of cases, physical evidence of the disease elsewhere is of great aid in deciding the character of the trouble. But the absence of a slight temperature, a loss of weight, or a negative finding for tubercle bacilli is no proof that we may not have a tubercular lesion to deal with. I had a patient who died last year of tuberculosis at the age of 55, who was four years under my care, and at the very beginning of his trouble, which consisted of a hoarseness from a one-sided ulceration of the cord, he had no physical evidences of tuberculosis, no temperature, no loss of weight, no tubercle bacilli and no lung involvement, and he remained free from any such evidences for almost three years; but the progress of the laryngeal disease was typical of tuberculosis.

The gumma of syphilis is the variety of this disease that may confuse the diagnosis for a time. But here the development is rapid. It appears suddenly and progresses rapidly to a breaking down and great destruction. Evidences of the disease are commonly found elsewhere. The history may be of assistance, but in my experience has proven of little value, as I have found very little veracity on this subject in those afflicted with this disease. Administration of the customary antisyphilitic remedies as a rule clears the horizon of any doubt, although one must remember the beneficial effect of this kind of treatment on some of the malignant diseases.

Chronic laryngitis presents a bilateral hyperaemia and infiltration in contradistinction to the usual unilateral character of malignancy. Pachydermia laryngis is a symmetrical affection located upon the vocal processes, an unusual site for a malignancy. The benign growths, as a rule, have no infiltration like the malignant ones and they grow towards the lumen in place of into the tissues, as do the latter.

There are forms of malignancy that at times present great difficulty in diagnosis. For instance, a cancer may take its origin deep in the tissues, and by its encroachment on the mucous membrane present a vegetating mass of proliferating tissue that has

the appearance of a papilloma. A round, smooth mass situated in the ventricle of Morgagni may look like a perichondritis. There may be a paralysis present, the result of a small malignant mass situated below the cords. A few of the obscure cases no doubt are the result of the presence of two different diseases, like cancer and syphilis, or cancer and tuberculosis, resulting in an atypical presentation. Confusion may also result from the appearances of a malignancy in a patient formerly known to have had tuberculosis or syphilis, as related by von Zencker and Schmidt.

Where a careful and systematic study of a case with the aid of a laryngoscope admits of doubt as to the true diagnosis, the aid of a microscope may be employed with benefit, although its findings are not always to be relied upon as conclusive. It is not uncommon to find a malignancy that presents the appearances of a papilloma, both clinically and microscopically, and unless the piece of tumor removed be very large and deep, the microscopic findings may prove misleading. The case reported by Knight of a supposed vocal nodule proving to be an epithelioma, and that of Sakolowski, where a supposed polyp proved to be an adeno-carcinoma, and also Ward's case of primary papilloma resulting in the appearance of an adeno-carcinoma, show the possibility of such error. In Keen's case, only the papillomatous surface was at first examined, while deep down the true carcinomatous nature was revealed.

I cannot help but believe that were these cases of chronic hoarseness more carefully followed and watched, there would be less need for our depending on the microscope. It is true that the microscopic finding in many cases has been unsatisfactory and at times misleading, but this has been due almost as frequently to insufficient removal of tissue or incompetent examination of the same. When the first is sufficient and the latter trustworthy, the information should always be of great value; but a negative finding in a case clinically suspicious, or a suspicious case that cannot be disproved should not, after explaining the matter to the patient, deter one from performing a thyrotomy, even though it be but exploratory. Carefully and skillfully performed, there can follow no harm.

* Before any tissue is removed for microscopic purposes, the patient must be placed in full possession of the possibility of affairs, so that immediate radical measures may be undertaken for its removal by the external route.

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100 State Street.

The Influence of Nasal Obstruction on the Form of the Face.

W. B. PARSONS. *Lancet*, Sept. 30, 1905.

A study of the relation between a highly arched narrow palate and nasal obstruction when these conditions are found associated.

ST. CLAIR THOMSON.

RAPID CONVALESCENCE AFTER MASTOID OPERATIONS.*

BY W. SOHIER BRYANT, A.M., M.D., NEW YORK CITY.

In recent years, a great advance has been made in the management of the operative and after-treatment of operations on the temporal bone through the teachings of Blake and his followers, most noteworthy among whom are Sprague, of Providence, and Reik, of Baltimore. Blake's doctrine has been that physiological wound repair should be encouraged and that all cases following mastoid operations should not be treated as open sores, but allowed to close by the most rapid method which nature can provide.† The blood clot dressing and its variations mark a step toward the perfect physiological management of wounds which require for success more careful technique in preparing the patient for operation, in the operation itself and in the after-care, than was formerly of any advantage to the patient. In the blood clot, the advantages of a clean wound with healthy walls are turned to their greatest use. The more rigid technique required in the blood clot demands as clean an operative field as can be made. Dr. Reik has shown how important this is, and, with the use of his protective shield, he has succeeded in getting the largest proportion of primary unions. The technique of the operation itself must be adapted to protect the tissues which are left in the wound. Lacerations of the tissues, especially the periosteum, rough edges due to the use of dull instruments, contusions caused by ligatures, forceps, clamps and retractors should all be reduced to a minimum, and the tissues which have unavoidably been maltreated should be removed before the wound is closed. The chemico-physiological factors of success are still more important and depend on the following facts; namely, that the blood has a decided bactericidal action; that living tissues cannot withstand great changes of temperature or dessication; that the normal reaction of these tissues is alkaline; and, further, that any chemical substance which tends to lower the vitality of the tissues, whether it has a bactericidal action or not, has a retarding effect on nature's reparative work. It follows, then, that nothing more active than dry wiping or physiological salt solution, at the temperature of the body, should be used in the wound for cleansing purposes.

* Read before the Eleventh Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology, St. Clair, Mich., August 30, 31 and September 1, 1906.

† See Bibliography.

The method of closing the wound is of considerable importance, for in this way infection may be easily introduced. Dr. Reik uses a subcutaneous, silver-wire, continuous suture. He thus avoids the risk in the use of infected suture material and the puncture of an infected skin. At the same time he has the advantage of a substance chemically antagonistic to bacteria.

As to the instrumental technique, those instruments and methods which require the shortest time, with the least mechanical jar to the patient, with a maximum of safety, are the means to be used.

The post-operative and convalescent management of the wound is practically *nil* in cases which heal immediately by first intention. In the large class of cases which do not heal rapidly by first intention or which develop any infection, constant, watchful care and nursing are required to minimize the duration of convalescence and to obtain the desired results. The majority of cases do not offer any expectation of complete primary union. A small cigarette drain one-eighth inch in diameter, which should be removed after twenty-four hours, seems to insure a rapid convalescence, and in cases of infection allows an outlet for the products of inflammation. The use of the cigarette drain facilitates the management of all cases advantageously, because it does not interfere with the rapid convalescence of the non-infected wound and does hasten the convalescence of the infected. The convalescence of infected cases can be hastened also by following the same principles which are laid down for the non-infected cases, plus the factor of prolonged drainage and cleansing without packing. If the products of inflammation can escape readily, the less the wound is handled the better will be the result.

Cases showing the application and result of the foregoing principles:

CASE I.—A child 4 years old. Chronic purulent otorrhoea. Swelling and tenderness of mastoid region. Extensive myringotomy was done and a half inch post-aural incision was made down to the bone. The mastoid cortex was found very dense and thick. There were no pneumatic cells and the antrum was very small. A general osteitis was present. The front-bent gouge, rongeur and curette were used for excavating. The wound was cleansed with physiological salt solution and closed without sutures. A gauze wick was placed in the canal. The operation lasted twelve minutes. *1st day.* Wound healed by first intention. Gauze taken from meatus, which was cleaned with peroxide of

hydrogen and wiped with alcohol. *4th day.* Middle ear dry and post-aural wound solid. The post-aural scar is scarcely perceptible and there is no irregularity of the skin.

CASE II.—A child 3 months old. Purulent otorrhoea two weeks. Severe symptoms of mastoid abscess for four days. An extensive myringotomy was done. An incision a half inch long was made down to the bone covering the mastoid antrum, the periosteum was retracted, and the bone and antrum opened with a curette to remove the softened bone, granulations and cheesy detritus. The wound was washed with salt solution. A small cigarette drain was inserted in the wound and a gauze drain in the meatus. The wound was not sutured. The operation lasted six minutes. *2nd day.* Middle ear was practically dry and the post-aural wound healed. The scar is not noticeable. The post-aural surface is normal.

CASE III.—Child 4 months old. Acute purulent otitis media with mastoiditis. Extensive myringotomy. Post-aural incision five-eighths inch long opened a subperiosteal abscess. The bone was excavated with a curette, and the granulations and softened bone removed from the antrum and its neighborhood. The wound was flushed out with saline solution and closed, and a small cigarette drain inserted. The operation lasted fifteen minutes. *2nd day.* Dressed by house officer. *3rd day.* Wound swollen and discharging. Meatus contained fetid pus. Cleansed with peroxide of hydrogen. *5th day.* False membrane covered the wound. Slight fetid discharge in the meatus. Cleansed with peroxide of hydrogen. *9th day.* Wound healed and middle ear dry. Scar scarcely perceptible and post-aural surface normal.

CASE IV.—A girl 16 years old. Chronic purulent otorrhoea three years. Pain in ear two weeks; headache and dizziness one week. Usual short incision. The antrum was opened with the front-bent gouge. Pus was found in antrum and cells. The bone was sclerosed. The radical operation was done with the front-bent gouge, rongeur and curette. The dura was exposed over the tegmen antri. A meatal flap was cut. The wound was washed with salt solution and closed without sutures. A gauze wick was put in the meatus and a gauze dressing over all. The operation lasted forty-five minutes. *3rd day.* Wound healed by first intention; wick removed. *17th day.* Middle ear practically dry. *21st day.* Middle ear epidermized. Post-aural scar linear and scarcely perceptible; post-aural surface normal.

CASE V.—Woman 27 years old. Caries of tympanum and chronic, purulent, fetid otorrhoea since childhood. No tympanic membrane on ossicles. Usual post-aural incision. The front-bent gouge did the excavating through eburnated bone containing no cells. The knee of the sinus was uncovered. It projected over the antrum. The dura of the middle cranial fossa was uncovered. The usual radical operation was performed. A plastic flap of the meatus was cut. The wound was washed with salt solution and closed without sutures. A small cigarette drain, which was removed on the second day, was inserted. The operation lasted one hour. *6th day.* The post-aural wound was healed, and the middle ear practically dry. *23rd day.* The tympanum was epidermized. The scar is scarcely perceptible and the post-aural surface is normal.

CASE VI.—Girl 12 years old. Purulent otitis since infancy. Two post-aural sinuses leading into the bone. The bone was entered with a curette, and with a rongeur and front-bent gouge the radical operation was completed. The dura mater was uncovered in both fossae. The knee of the sigmoid sinus lay far forward. A flap was cut in the meatus. The wound was washed with salt solution and closed with a subcutaneous silver wire suture. A gauze wick was placed in the canal. The operation lasted forty minutes. *1st day.* Changed outside dressing. *2nd day.* Wound and meatus foul. *3rd day.* Wound foul, but healing at angles. *4th day.* Sloughy. Cleaned with peroxide of hydrogen. *5th day.* Improved. *6th day.* Wound breaking down. Syringed with peroxide of hydrogen. *7th day.* Wound clean. *13th day.* Middle ear practically dry and post-aural wound healed. *18th day.* Middle ear epidermatized. Faint linear scar; smooth post-aural surface.

CASE VII.—Girl 16 years old. Acute infective otitis media of several weeks' standing. Thickening and nipple formation of tympanic membrane. Persistent mastoid tenderness. Complete myringotomy was done; a one and one-half inch post-aural incision was made. Extensive osteitis was discovered, and an epidural abscess with the sinus granulating from the knee to the jugular bulb. A large amount of bone was removed and a broad extent of dura mater in the posterior fossa and a little in the middle fossa exposed. The rongeur and curette were used for the bone work. The wound was washed with saline solution and closed with subcutaneous silver suture. A small cigarette drain was inserted. The operation lasted forty minutes.

3rd day. Removed cigarette drain. Wound healed by first intention except at hole left by drain. 5th day. Middle ear dry. Removed subcutaneous wire suture. Wound all healed by first intention. Watch heard 20 inches. 31st day. Condition remained good. Hearing 5 feet for watch. Faint linear scar. Post-aural surface even.

These cases show the results of treatment by blood-clot for simple mastoid, drained blood-clot for simple mastoid, the results in an infected mastoid wound after the use of a drained blood-clot, the results in a mastoido-tympanic operation treated by blood-clot, and one treated by the drained blood-clot, and an infected case after mastoido-tympanic operation treated by blood-clot. Five of the cases show rapid and satisfactory healing by first intention and two by second intention after infection and sloughing of the wound. The case of epidural abscess treated by the drained blood-clot was followed by rapid and uneventful healing by first intention.

57 W. 53rd St.

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THE MASTOID BLOOD-CLOT OPERATION, THEORETICALLY GOOD; WHAT RESULTS WILL SHOW.

BY HENRY GLOVER LANGWORTHY, M. D., DUBUQUE, IOWA.

Since the introduction of the mastoid blood-clot operation, recommended by Dr. Clarence Blake of Boston in 1892, a considerable amount of literature has appeared in favor, and very little against, the use of the method in aural surgery. Dr. Blake's initial experiments "had in view the determination of the value of the blood-clot in mastoid operations as a substitute for the usual method of packing and healing by granulation and began naturally with its application to acute cases only, but later on was applied to chronic cases, it being of course understood that the most complete possible removal of all diseased tissue was an important preliminary to success."

The procedure was as follows: "At the close of the operation the mastoid wound was allowed to fill with fresh blood either from the depth of the mastoid or, if this remained dry, from the scraped edges of the superficial wound, which was then closed either by stitches or by simple apposition with dry pressure pads."

In later years, to meet nature's demand for some drainage, the method was slightly modified and the incision closed with the exception of a slender wick, not extending, however, as far as the mastoid antrum. The blood clot in this closed cavity was intended to become organized within a very short time with the formation of new osteo-blasts in forty-eight hours. Under these circumstances a condition more nearly approaching the restoration to normal was thought to have been secured than if the wound were packed and allowed to fill in by granulations.

In general surgery, the method was at that time distinctly new. Successful attempts had already been carried out on cavities and dead bone spaces by filling them with material which might become organized, such as blood-clot alone or in association with decalcified bone chips. Even here the majority of the blood clots in long bones became infected and broke down, which perhaps accounts for the fact that it is now proposed to substitute a mixture of paraffin and iodoform. The above had also been done as fully in accordance with the fundamental surgical teaching—where there is pus forming, drain—as possible, and was only used in wounds in which the surgeon was confident that all of the diseased tissue had been removed

and there was small chance for an acute suppurative process to be developed. This cavity prepared for the blood-clot was actually a closed one and not constantly receiving the purulent discharge from an adjacent suppurating space.

In the mastoid process, with its innumerable bony cells extending in every direction—backward over the occipital bone, forward into the zygoma, downward beneath the facial canal, and even inward beyond the labyrinth—we may, in the first place, consider the case as most fortunate in which all septic material can be removed. In the second place, owing to the opening of the aditus into the middle ear, the mastoid cavity is not a closed one. Suppuration continuing in the tympanum flows backward into cavity as easily as into the external auditory meatus. It is impossible to expect the swelling of the delicate lining of the aditus to be sufficient to block off the mastoid wound from the middle ear. We know that this is not so from the fact that in every acute inflammation of the middle ear there is a certain amount of concomitant inflammation of the membranous lining of the bony mastoid cells. Such a sequel could not occur if the aditus was closed. It is claimed by the advocates of the blood-clot method that the bactericidal power of the blood-clot resides principally in the serum. Reasoning from this, it would seem possible for the greater part of the blood serum allowed to fill the mastoid cavity to run out through the middle ear and external canal. I cannot agree with the decidedly biased opinions of some that the term blood-clot is almost a misnomer, the clot wholly draining out through the middle ear. If a wick, however, be it ever so thin, is introduced from the outside, it does then seem improper to speak of the operation as a blood-clot, there being no more clot than found in any surgical wound.

Dr. Blake continues: "Apparently the serum during the first forty-eight hours preserves its powers of resistance, for in the cases of thorough breaking down of the blood-clot this did not occur until forty-eight hours had elapsed. By that time the clot is so thoroughly organized that it resists the infection, or else provides a culture media which breaks down very thoroughly, giving immediate external evidence of what is going on and leaving the mastoid cavity as free and open as it would have been if it had been packed."

While the above may hold true in a few selected cases, any risk of reinfection in this region, with the nearness of such vital structures as the brain and cranial sinuses, should be avoided. Products of suppuration must burrow somewhere, and there is no escape externally unless the wound be again reopened. Of course considerable

drainage is afforded through the middle ear and canal, as indicated by a profuse discharge. With an added increase in the quantity of discharge from the middle ear, the danger of permanent, even though slight, impairment of hearing is proportionately greater. One of the chief benefits derived from draining the mastoid wound with a wick has been the good effect on the middle ear. That we could not expect in the blood-clot method, as Dr. R. C. Myles has pointed out.

Usually the secondary mastoid abscess evacuates itself spontaneously. With the breaking down of this carefully sutured wound and the attendant inflammation one is prepared to believe that the time of healing is actually delayed rather than shortened.

In a discussion following the second paper in 1899, Dr. J. Orne Green is quoted as follows: "I have had really no experience in the use of the blood-clot because it did not appeal to me on account of the uncertainty in getting the infected cavity absolutely clean. What could be the advantage of the blood-clot over the cases we see so many of, especially the acute cases, when we clean them all out, get them aseptic and in the course of a week or ten days the bone

It has occasionally been stated that in order to secure a real blood-clot in the mastoid antrum something like the following experiment would be necessary: At the close of the operation and just before allowing the cavity to fill with blood some sterile substance, such as a piece of lead foil, would be required to plug the opening leading into the middle ear. With the closure of the external incision the cavity would then be a sealed one filled with blood. We might expect primary union from this throughout. The following case is an interesting example of a blood-clot performed under uncommon circumstances: The patient, an adult thirty-five years of age, was admitted to the Massachusetts Charitable Eye and Ear Infirmary December 11, 1905, on the aural service of Dr. F. L. Jack. There had been a history of two or three previous attacks of moderately acute inflammation of the left middle ear. Present otorrhoea (serous) was of two weeks' duration. Persistent mastoid tenderness at tip for several days. An exploratory operation was advised by Dr. Jack. The operation was as follows: Membrana tympani incised. Mastoid cells curetted out—one or two cells found rather soft and containing a few questionable granulations. The bone was chiseled away toward the antrum for a very considerable depth but the antrum was not reached. With the mastoid process apparently normal and the antrum unopened, the cavity was allowed to fill with blood and the external wound closed as tightly as possible. Sterile pad and bandage. The serous discharge from the middle ear continued. On the sixth day following this ideal operation, and much to my surprise, the posterior wound suddenly began to bulge. The wound was re-opened and a dark reddish-brown blood-clot just beginning to break down was evacuated. The wound not being allowed to close entirely, healed rapidly in two weeks.

Reik: "The normal human blood possesses bactericidal power, varying in degree in its antagonism to different micro-organisms; this property of the blood is greater after it is drawn from the vessels than while circulating intravascularly; the microbe destroying substance is found in the serum, but is produced by the leucocytes; certain chemical changes in the blood may be induced either to increase or to diminish its bactericidal power, and this property of the blood naturally diminishes after the clot is forty-eight hours old."

Smith, Theobald, is quoted as saying: "We are not yet sufficiently well acquainted with the favoring or inhibiting action of the blood upon bacteria. Laboratory work has largely been done with blood serum in contradistinction to the entire blood and the possibly favoring action of the blood corpuscles or their constituents has not been hitherto considered. It is highly probable that the blood corpuscles themselves do favor the growth of many bacteria. For the growth of certain bacteria, such as the influenza bacillus, haemoglobin or its derivatives are essential."

granulates without any discharge and we then let the wound heal up? That is a process we see not infrequently. We do not get that down to nine days, but we get healing within two or three weeks that way. I must say that I am afraid of closing a wound that has been septic, and especially a wound like mastoid where there is so much uncertainty about rendering it aseptic. I cannot but think that in certain cases we might make a mistake by using the blood-clot method."

At present the disagreeable features constantly presenting themselves are as follows: The mastoid cavity being allowed to fill with blood at the end of the operation, the posterior wound is closed for primary union. A couple of days later an increase in the discharge from the middle ear is noticed with tenderness around the auricle. In four or five days the posterior wound fills with pus and there develops considerable pain, temperature, with perhaps slight tenderness in the neck just below the incision. The stitches being at once removed, the wound thoroughly reopened and drained, there is then no further difficulty. Occasionally the wound opened spontaneously. In one or two instances I have seen secondary counter-incisions in the neck made necessary where the pus had extended downward under the sheath of the muscles. One is of course obliged to admit that bad results may follow any operation even with the best drainage.

Granting that a certain small percentage of very excellent results have been shown in picked cases, what are we to expect in the remainder less fortunate? It does not seem reasonable to suppose, as outlined by Reik⁴ and Bryant,¹² that "in cases in which the blood-clot fails to organize there is no additional risk to the patient, should the wound not have been as clean as supposed or should the clot become infected in any one of the various possible ways." Is the patient, after the wound has been reopened, cleaned and packed in the usual way, in the same position that he would have occupied had the open method been employed primarily? Considered physiologically, the blood-clot may be and indeed is reasonable enough, but practical tests in this special region leave much to be desired.

Dr. Jack⁵ reports a series of sixty cases of blood-clot operations taken from the records of the Massachusetts Charitable Eye and Ear Infirmary, ten of his own and the remainder by the different members of the staff. The blood-clot became disorganized in forty-eight or eighty per cent. Of the small number which did not require reopening, the discharge from the middle ear was protracted with con-

sequent destruction of the membrana tympani and increased impairment of hearing. The length of time for recovery in some cases extended over several months. Uncomplicated healing was obtained in but four of the entire series. After a careful consideration he "fails to appreciate the advantages of the so-called blood-clot method over the one generally in use."

Dr. Bryant¹⁰ has modified the blood-clot operation by performing what he terms a drained blood-clot, that is to say, a light wick is introduced at the lower corner of the wound. Twenty-four hours later the drain is removed, allowing the corner of the wound to collapse. This he claims insures a more rapid healing than in those cases in which the drain is left as long as a week. He uses this in all cases that do not promise well for the simple blood-clot. On what grounds he proposes to separate the indications for each it is hard to say. For justification in allowing the wound to remain closed he points to the chance of rapid healing and the improved cosmetic results which are supposed to be so noticeable after the blood-clot dressing.

One naturally agrees with Hammond that "in all operative procedures the question of paramount importance is not the production of as little scar as possible or making the treatment of short duration, but what measures will be safest for the patient." Dr. Dench of New York says that every case in which he has given the blood-clot dressing a trial the wound has broken down, requiring reopening and drainage.

The employment of the organized blood-clot in the healing of mastoid wounds is, according to Sprague,⁶ still an experimental procedure. If this be true, we may yet hope to have a substantial percentage of primary healing following this method. At present the expe-

Blake: "In twenty-five cases of mastoid evacuation, made the subject of the blood-clot experiment in 1896-7, sixteen were so-called acute and nine cases of long continued suppuration with later mastoid implication. Of the sixteen acute cases, seven recovered by primary healing and were discharged well, one in twelve days, two in eleven days, two in ten days, and two in eight days, thus giving an average of ten days. In the nine remaining acute cases and the nine chronic cases, it was necessary to reopen the wound in the manner mentioned and allow it to heal by granulation from the bottom. In this series of twenty-five cases, therefore, the percentage of recovery in the time mentioned in acute cases is 43¾ per cent, and is the total number of cases in this series twenty-eight per cent."

Sprague: "In sixty-nine cases the typical blood-clot method was used and forty-two of them healed without interruption in from seven to fifteen days. In the use of the blood-clot in the radical operation my experience is limited to sixteen cases and only two of these succeeded."

Dr. Bryant reports favorable results in the use of the blood-clot in the radical operation. The external wound was closed, except for the introduction of a small cigarette drain. Out of twenty-three cases done according to this method three became infected.

Drs. Gruening, Sneppard, Phillips and Duel are opposed to closing wounds by the blood-clot method. This method of closing mastoid wounds where the dura or sinus has been exposed was most strongly condemned by Dr. W. Le-compte (now deceased).

riments in blood-clot operations teach us not so much the value of the blood-clot in the mastoid as the fact that it is also unnecessary to leave a large wound gaping throughout its length to heal by granulations. Between the two there is a more practical path. We may close the wound almost entirely and cover whatever bone possible so long as there is left sufficient space for drainage, even though that be small.

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INTRA-NASAL DRAINAGE OF THE FRONTAL SINUS.

BY E. FLETCHER INGALS, M.D., CHICAGO.

In the February issue of the *Laryngoscope*, page 124, Halle refers to my operation for Intra-Nasal Drainage of the Frontal Sinus in part as follows:

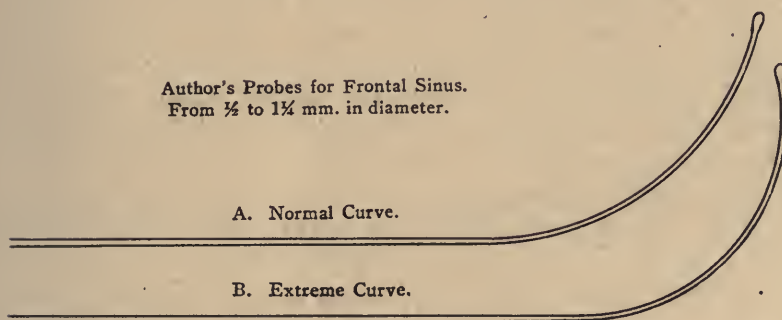
"Ingals, indeed, has announced a way to make the opening into the cavity from the nose; he introduces a probe into the frontal sinus, slides a flexible drill upon the probe and pulling the probe forcibly to the front he removes the anterior wall and the floor of the sinus."

The author evidently did not fully understand my operation. I introduce the probe into the frontal sinus and pass the flexible drill (or burr) over it, but do not make the effort to pull it forcibly forward, as he suggests; and do not remove with it the anterior wall and floor of the sinus, but only so much of the walls of the naso-frontal duct and the floor of the frontal sinus as necessary to give a drainage canal 6 m. m. in diameter. Halle refers to the supposed dangers of injuring the tabula interna and the lamina papyracea. I have done the operation a good many times and I feel confident that there is not the slightest danger of injuring the tabula interna; indeed, as the probe (or pilot) extends beyond the burr, it is impossible for the burr to cut this table; it is impossible indeed for the burr to cut anything more than 3 m. m. from the very center of the probe.

Further, he states, "In the first place it is a question whether the naso-frontal duct can be probed in a living person." I think there must have been some error in the translation of this statement, for in the context he says, "That this is possible in many cases, especially after the removal of the anterior portion of the middle turbinate, would seem to be sufficiently proved." Replying to this, I would state that Coakley says that he thinks it is possible to pass a probe into the frontal sinus in 90% of the cases of empyema of this cavity. In a considerable number of cases of chronic empyema of the frontal sinus I have not failed in this procedure but once, and that only temporarily; although in one acute case I failed utterly even to find the orifice of the naso-frontal duct and I am inclined to think that a good deal of difficulty would be experienced with acute cases. In the chronic case, in which I at first failed to pass the probe into the frontal sinus, I had no difficulty in passing it from the hiatus

semilunaris into an anterior ethmoidal cell where I found denuded bone. Finding it impossible to get the probe into the frontal sinus, I ran the burr into the ethmoidal cell, thus enlarging the opening in the hiatus semilunaris and directly afterward I passed the probe into the frontal sinus and then ran the burr in over it. I think this procedure will be necessary in some cases and I can see no possible objection to it, for it must be remembered constantly that the burr cannot pass beyond the end of the probe and no nearer to the end of the probe than we desire. Very small steel probes may be used for the purpose with perfect safety. I think that the usual difficulty in passing the probe into the frontal sinus arises from its not having been bent near enough to a right angle. In some instances it must be bent even farther than this, but the usual, or what we might call the normal curve, may be considered about 45° , as shown in Fig. A, whereas in some cases it would have to be bent

Author's Probes for Frontal Sinus.
From $\frac{1}{2}$ to $1\frac{1}{4}$ mm. in diameter.



much farther, as shown in Fig. B. As it is not desirable to have many tubes with different curves, I would recommend that when it is found necessary to bend the probe farther than the normal, it would be well, after passing the burr into the frontal sinus, to then introduce a probe with the normal curve and run the burr in over it, so as to make a canal that the tube would readily fit. I have done the operation now many times, and each time I am more and more impressed with its safety and its value. I believe that the number of cases in which the external operation is desirable will, by this procedure, be reduced to about 5% of all cases of chronic suppuration.

I have no criticism to make of Halle's method, but am confident that it is more difficult and dangerous than mine, and it appears to me likely to cause the patient more discomfort.

34 Washington St.

PROF. GUSTAV KILLIAN AND HIS WORK. EXPERIENCES OF A RECENT VISIT TO FREIBURG, GERMANY.*

BY WILLIAM E. CHENERY, M. D., BOSTON.

Freiburg, sometimes called the "Pearl of Breisgau," is a beautiful city, situated on the borders of the famous Black Forest in southwest Germany and south of Heidelberg. It is a manufacturing town of about 76,000 and is an old and important educational center, famous for its university, which has about 2,000 students, more even than Heidelberg.

The busy laryngologist on a short vacation tour of inspection is not so much interested in the beautiful walks and drives around Freiburg, the Schlossberg or the miraculous spring of St. Ottilien, the noted Gothic Cathedral or the curious old town gates. To him the central attraction is one who for years has been foremost in the advancement of our specialty, Dr. Gustav Killian, Professor of Laryngology and Rhinology, in the University of Freiburg. Prof. Killian's achievements are well known, but perhaps it would not be out of place to recall some of his special work. You are familiar with his method of examining the larynx, which makes possible a view of the posterior laryngeal wall, and subglottic area. By this method a good view of the trachea to the bifurcation is often obtained. Guisez says: "C'est Killian qui est le veritable createur de la tracheo-bronchoscopie."

Kussmaul attempted direct oesophagoscopy in 1868. While Mackenzie and Mikulicz, Hacker and Rosenheim had developed the method, and had removed foreign bodies by means of tubes before 1895, Killian in that year showed the possibilities of the use of the bronchoscope. In March, 1897, he removed a bone from the trachea. This led to the exploration of the bronchi, and on July 24, 1897, he showed to the medical society that he was able to introduce tubes freely into the air passages. By his experiments he learned that the bronchi were extensible and freely movable. This made possible the adoption of superior bronchoscopy. He also found by turning the head of the patient, he was able to explore the right or left ramifications of the bronchi.

* Read before the Meeting of the Eastern Section of the American Laryngological, Rhinological and Otological Society, Providence, R. I., January 5, 1907.

In September, 1899, he first reported his method of submucous window resection of the nasal septum, which operation has been perfected by Killian and our own rhinologists, until now the submucous resection is by many considered the best, and by some, the only operation for septal deviations.

In 1902, he published a description of his radical operation on the frontal sinus. Besides, Killian has done much research work in embryology and in the comparative anatomy of the nose and nasal cavities. The results were published in 1904 in his "The accessory sinuses of the nose and their relation to the neighboring parts." He has devised many instruments. His speculum and submucous instruments are well known; and his bronchoscopic instruments are numerous. The right-angled trocar for washing the antrum of Highmore, the "V"-shaped chisels and eye protector for the frontal sinus operation, his sphenoidal punch, not to mention many other instruments, show his mechanical genius. He has written many articles for the German, French and English journals; besides he has made numerous charts and models. I remember the pride with which he showed me a very large papier-maché model of the maxillary bone, with the turbinates attached, which he used for instruction purposes.

In the latter part of August it was my privilege to be in Freiburg and be a visitor in Killian's clinic. He was cordial in his greeting and seemed to be pleased to have Americans visit him. His keen eye and quiet manner immediately betokened the real student. He is about fifty years of age. He speaks English fairly well. However, after a few pleasant words, or answering questions, he is apt to retire to his private office, which adjoins the general clinic room, leaving the visitor in the care of his first assistant, Dr. Karl Von Eicken, who is very genial and affable. Von Eicken speaks English fluently and takes great interest in explaining Killian's methods. As an assistant, he is under a five years contract at a nominal salary, and during that time can not practice privately. This custom is most excellent, for it assures the master of a valuable assistant, and makes possible much research work.

What can one accomplish in a short time in Killian's clinic? By arranging before hand as to time, one can take a very instructive and practical course in bronchoscopy and œsophagoscopy. Many of us have had the opportunity of taking Dr. Mosher's most excellent course, and practiced passing the bronchoscope and œsophagoscope on the cadaver. In Freiburg, one learns the technique, and actually passes the tubes on the living. To see the ease with which

it may be done, without a general anæsthetic, is very interesting and shows the possibilities of a larger use in the future.

The course includes the history of tracheo-bronchoscopy and œsophagoscopy, the use of Kirstein's head lamp, which Killian uses; and practice in diagnosing foreign bodies at the end of different length tubes. Killian does not use the tubes with a light near the end. Having become proficient in this, inferior bronchoscopy is practiced, with 20% cocaine as the local anaesthetic. After entering, at right angles, the tracheotomy wound, the tube is passed downward to the bifurcation, when cocaine must be again applied. The patient sits on a low stool and the operator stands directly in front of him. After thoroughly cocainizing the bifurcation, the exploration may proceed to the bronchi, care being taken to be gentle in the manipulation.

Superior bronchoscopy is then practiced, the parts being well cocainized with 20% cocaine. The divided Kirstein autoscope is used to assist in the introduction of the tube, until past the vocal cords, when it is removed and the examination proceeds as in inferior bronchoscopy, the position of the patient and surgeon being the same. If a general anæsthetic be given, Rowe's position is used, and the surgeon stands at the patient's head and facing his feet.

The last exercise is in œsophagoscopy, which is performed with the aid of 20% cocaine, applied as before, to the pharynx and fauces, and base of tongue and arytenoids, with a swab. To assist in introducing the instrument, the finger is used as a guide, and a flexible bougie is introduced through the tube about two inches. The instrument must be well oiled. The cricoid is the greatest obstacle in the passage of the instrument. Force must not be used. When past this point the bougie may be withdrawn and the instrument passed downward, at the same time inspecting the walls of the œsophagus.

The endoscope and cystoscope have been used with much success in other parts of the body. Because a few accidents occurred in earlier years from crude instruments and faulty technique, direct examination of the œsophagus and trachea have been avoided. But Mikulicz long ago said every normal man could be examined with the œsophagoscope. Prof. Stark says, passing the œsophagoscope depends more on the skill of the examiner, not on the anatomical build of the patient. Great improvement has been made; and since 1900, hundreds of examinations have been made without accident.

The laryngologist will be called on more frequently not only to remove foreign bodies from the trachea, bronchi and œsophagus,

but also to treat medically and surgically, these parts. In the same line, Dr. Chevalier Jackson has shown us that direct inspection and treatment by means of the gastroscope, is within the province of the skilled laryngologist. What we need is practice. More attention to this subject should be given in our medical schools. The use of these instruments is applicable to ulcerations of tuberculosis, syphilis, and beginning cancer; to direct examination of tumors, benign and malignant; to diverticuli and stenoses from various causes; to neuroses, as well as foreign bodies. Also by giving the exact location of disease, proper surgical procedure may be aided.

Killian has removed a sarcoma in a man of sixty by the natural passages. It is contraindicated in extremely nervous people, in advanced age, where there is a rigid vertebra, in extreme cachexia, and advanced tuberculosis; also in emphysema and acute inflammatory processes of the lungs; in aneurism of the aorta, and in organic heart disease. The difficulties of superior bronchoscopy and œsophagoscopy are in having a good set of teeth and a short, thick-set neck.

To one who is used to the large clinics of our hospitals, the clinic at Freiburg seems small; during my stay, there were not more than ten to fifteen patients per day. From one who spent several months in Freiburg, I learned there were never more than twenty to twenty-five. From the fame of its clinician, however, material is drawn from a very wide circle.

A few points noted in the frontal sinus operation I saw Killian do may be of interest. The patient was a man of about 45 years, with left chronic frontal sinusitis, previously operated on by the Ogston-Luc method, with only temporary relief from pain and suppuration. The patient had come many miles for operation by Prof. Killian. A careful intra-nasal examination and X-ray showed the presence of the disease and extent of the sinus. Ether was the anæsthetic. No post-nasal plug was used, only the three cigar-shaped pieces of cotton packed through the anterior nares. The head of the patient was slightly raised during the operation. The eye-brow was not shaven. Great care was taken to preserve intact the periosteum over the narrow bridge, and the orbit was protected well by an assistant, with Killian's orbit guard and retractor. The opening below the bridge was made as large as possible, and great care was taken in exploring the whole of the sinus, especially the orbital portion, and all septa were removed. All the ethmoidal cells were carefully destroyed. The wound was closed by aluminum bronze sutures. The nose was lightly packed with gauze for twenty-

four or forty-eight hours. Light compression was made over the frontal to make the tissues sink into the sinus cavity. The patient, afterward, was not allowed to blow the nose, but was instructed to sniff back into the throat all secretion. Crusts were removed from the anterior nares by forceps. Several cases radically operated on some time before were seen, and the results were very satisfactory, relief from pain, cessation of suppuration, and only slight deformity. One man, who had a very large sinus, and so more deformity, received a second injection of cold paraffin while I was there, completely filling out the depression.

All over Germany severe operations are being done with injections of cocaine and adrenalin, which we would consider must be done under general narcosis. I saw several mastoids, an excision of the jaw, and several radical Caldwell-Luc operations on the antrum, all done under cocaine anæsthesia. One day, in Killian's clinic, a young man, 21 years of age, had a Caldwell-Luc operation on his antrum, sitting upright, with only the use of cocaine and adrenalin. At the end of the operation the young man was a little faint. After lying down for a few minutes, he walked back to his room in another hospital building; no packing having been put into the antrum. He did very well, and had no post operative hemorrhage.

Killian is a thorough anatomist, an experienced and resourceful surgeon. Careful and thorough in his operations. A man justly famous. A worthy guest of our next annual meeting.

222 Huntington avenue.

The Difficulties and Dangers of the Mastoid Operation, the Vicissitudes of Convalescence and the Ultimate Result to Patient.

CHARLES A. BALLANCE. *Lancet*, Sept. 30, 1905.

A consideration of the dangers of the operation; the vicissitudes of convalescence, such as temporary paresis of the facial nerve or delayed healing; the ultimate results; and the selection of cases for operation.

ST. CLAIR THOMSON.

REPORT OF A CASE OF LATERAL SINUS AND JUGULAR THROMBOSIS WITH ABSCESS DEVELOPMENT IN THE NECK. RECOVERY.*

BY J. J. THOMPSON, M.D., NEW YORK.

Notwithstanding the large number of recoveries following excision of the jugular vein that are being reported almost daily, I consider the following case, on account of some peculiarities that it presented, worthy of being added to the list.

The patient, an Italian child, nine years old, when brought to the Manhattan Eye, Ear and Throat Hospital, presented the following condition, and gave the following history: For one year she had had a discharge from the left ear, and for three weeks previous to admission, had complained of pain on the right side of her head. Two days before coming to the hospital, a tender swelling developed along the anterior border of the left Sterno-cleido-mastoid muscle. She presented all the symptoms of a child suffering from a severe toxæmia. She was very anæmic and emaciated; her pulse, although only eighty, was weak, and her face wore the characteristic worried appearance. The mastoid was not at all tender, but pressure over it caused pus to flow from the auditory canal. The membrana tympani was almost entirely destroyed, and the middle ear was partially filled with granulations. The glandular swelling in the neck was very sensitive to pressure. Her temperature in the morning was 97 degrees. At this time, I was not able to obtain a very complete history, owing to the inability of her father to speak English, and even in the presence of the symptoms of septicæmia, above enumerated, and the glandular enlargement in the neck, I did not suspect the presence of a clot in the lateral sinus, but was of the opinion that her condition was due to the continued absorption of toxins during the three weeks that the mastoid infection had been present. I afterward learned that she had had occasional chills and some sweats, for two weeks previous to the time I first saw her.

On the afternoon of the day of admission the regular mastoid operation was undertaken. The antrum and mastoid were filled with pus, in fact the entire mastoid was one pus cavity, the intercellular trabeculæ being entirely broken down and disintegrated. Pus oozed from around the lateral sinus on all sides and escaped

* Read at a Meeting of the Mt. Vernon Medical Society.

under some pressure when it was separated from the bone. A posterior incision was made and the lateral sinus uncovered for about two inches posteriorly, and considerable of the cerebellum was exposed at the same time, showing a large epidural abscess in this region. The sinus was then opened and found to contain a clot which extended beyond the bulb below, and as far as the torcular behind. This was thoroughly removed from the sinus where it was exposed, and the necrotic walls cut away. The condition of the child at this time would not permit any further work, so the wound was packed, and the patient was returned to the ward. Under vigorous stimulation her pulse improved in quality, although it remained between 160 and 170, her temperature being 101 degrees. The following morning her condition was much improved, and under the circumstances was very good indeed. The temperature was normal, pulse 130, and her facial expression much better than on the previous day. The differential blood count showed the presence of 14,000 leucocytes per cubic mm, of which only 77% were of the polymorphonuclear variety. Notwithstanding the general improvement in her condition, the presence of such a small percentage of polymorphonuclear leucocytes looked rather ominous. The following morning her mentality was not as good, or her cerebration as rapid as on the previous day; she was becoming drowsy, and difficult to arouse, but we considered her heart action had improved sufficiently to allow of the removal of the jugular vein and infected glands.

Accordingly, in the afternoon, through the usual incision, extending from the tip of the mastoid to $\frac{1}{2}$ inch above the clavicle, along the anterior border of the Sterno-cleido-mastoid muscle, several large glands were removed, and an abscess cavity surrounding the vein was opened. The vein in its lower part was apparently normal, and was filled with fluid blood, the quantity of which varied with each inspiration. It was first ligated as low as possible, and then dissected upward. Just above the entrance of the facial and lingual veins, and at the point where it formed the center of the abscess cavity, its walls were entirely destroyed, nothing remaining but a slender string of tissue. On following this upward its continuity with the upper part of the vein could be established, and pus could be seen to ooze from its lumen. The pus that enveloped the vein was very foul and the destruction of the surrounding tissues extensive, even the outer coat of the carotid artery showing a well-marked erosion. The remainder of the mastoid tip was removed, and the uppermost portion of the vein dissected out. No sutures

were used, the margins of the wound being drawn together with adhesive plaster.

Both the pulse and respiration were very weak, but under stimulation the patient reacted readily, and her subsequent recovery was rapid and complete.

For a week she ran a characteristic septic temperature, reaching 103 degrees at night and dropping to normal in the morning. After that it gradually assumed a more even curve, and in ten days remained normal throughout the entire twenty-four hours. The neck wound healed rapidly, leaving little more than a linear scar.

This is the first case in which I have had an opportunity of seeing fluid pus within the jugular vein, and it impressed me as peculiar that no metastatic development occurred, especially as the blood in the vein below the entrance of the facial, was undoubtedly fluid, as was evidenced by the change in its volume during respiration, a fact noticed at the time of operation. It is on this account that I have taken the liberty of reporting the case.

40 West 47th street.

Rupture of the Drum Membrane from Contrecoup. ALEXANDER BAUROWICZ. *Monatschr. f. Ohrenh.*, Berlin, Sept., 1904.

The patient struck the left side of the head and sustained a perforation of the right drum membrane, near the umbo. The possibility of the occurrence of such ruptures, without fracture of the skull itself, is important from a medico-legal standpoint.

YANKAUER.

The Treatment of Laryngeal Tuberculosis by Sunlight. ARTHUR BEAR. *Wien. klin. Wchnschr.*, March 8, 1906.

The patients are taught to sit in front of a mirror with their backs to the sun and by means of a laryngeal mirror, to reflect the sunlight into their own larynges. He reports several cases successfully treated in this manner.

YANKAUER.

CYSTIC POLYP.*

BY JOSEPH H. ABRAHAM, M. D., NEW YORK.

This interesting specimen of nasal polyp was removed a few days ago from a patient who first came under my care 8 years ago with the following history: Mrs. Y., age 38, born in Austria. Contracted measles when 6 years of age. At 16 contracted a severe attack of variola and suffered from severe frontal headaches. Eight weeks later, while in the garden, it rained and she was wet to the skin. From this she contracted pneumonia which lasted seven weeks. On recovery, the pain increased over the eye and there was a profuse, fetid, bilateral nasal discharge. When 18 years of age, she came to America, and married at 24. Her husband insisted upon her consulting a specialist for the severe headaches and nasal discharge, and she was operated upon for bi-lateral nasal polypi, and discharged cured. Five years later she consulted me, and on examination, polypi were found springing from both middle turbinates and ethmoidal cells, and profuse fetid discharge from the left side, due to chronic empyema of the frontal, ethmoidal and antrum cavities. After a radical removal of the polypi from the right nasal cavity, the pain disappeared from that side and there was no recurrence of the polypi. The polypi from the left side were then removed and the ethmoidal cells were thoroughly curetted. The fronto-nasal duct was also curetted and the frontal cavity treated through the nose; the antrum was drilled and treated through the inferior meatus. The patient made an uninterrupted recovery and was free from all pain when discharged. This condition continued until two weeks ago, when she consulted me, complaining of left nasal obstruction. Examination revealed a very large polyp springing from the anterior end of the middle turbinate. This was removed with a snare, and presented such a peculiar yellowish appearance that a section was made, and a large cystic cavity found filled with a thick yellowish, odorless fluid. There was no necrosis of bone or nasal discharge, and after a few treatments the patient was discharged cured. Owing to the peculiar pathological condition of the polyp it was thought that the pathologist's report would prove of interest. The examination was made by Dr. F. M. Jeffries.

* Read before the New York Academy of Medicine, Section on Laryngology and Rhinology, November 28, 1906.

Pathological Report. The nasal polyp with the peculiar cystic appearance has been examined, and I herewith submit my observations. The growth is composed of a highly vascularized fibro-mucous tissue which is somewhat cedematous and resembles the polypi common to the nose. The cavity you describe as having contained a fluid is nicely shown in the sections prepared for the microscope. So far as the sections show, the cavity was entirely closed, but there probably was an outlet at some point and the space had become distended by the aggregation of fluids. The outer surface of the growth



is covered largely by columnar epithelium, but at one area it is of the stratified squamous variety. The cavity is lined throughout by columnar ciliated epithelium. There is an acute inflammatory infiltration throughout the sub-epithelial structure of the inner cavity, which gradually diminishes as the outer surface is approached, so that there is little or no inflammation manifest on the outer surface.

616 Madison avenue.

LARYNGEAL URTICARIA, REPORT OF A CASE.

BY C. E. COOPER, A.B., M.D., DENVER, COLO.

The infrequent occurrence of laryngeal urticaria forms the chief motive for this report. Unfortunately the actual lesion was not visible, but sufficient clinical and objective evidence did exist to justify the belief in the presence of a wheal acting as an obstruction to respiration and located somewhere below the epiglottis.

Miss B., age 20 years, single and a nurse by occupation. Family history good. Was operated upon several months ago for appendicitis. Made an excellent recovery with evident general benefit to her health. For two weeks has been complaining slightly with rheumatism (articular) and has been taking aspirin and salicin in moderate doses, at the same time continuing her work.

On the evening of July 11th, after a meal of meat, potatoes, bread and butter and raspberries she was suddenly seized with a marked dyspnoea, choking sensations and cyanosis. She sought relief from another nurse who summoned an interne. He administered morphine, atrophine, nitroglycerine and amyl nitrate in an endeavor to relieve the dyspnoea. About one half hour afterward I saw her. She was extremely nervous, respirations about sixty and difficult, color good and pulse good. It fell to my lot to see her, not because any throat lesion was suspected, but because I happened to be in the hospital at the time and the sister in charge asked me to do something for her intense itching. From head to foot she was one mass of wheals and was evidently suffering extremely. In an endeavor to explain the marked dyspnoea and cyanosis of but a short time before, I examined the heart and lungs and found both normal. I then examined the throat; the pharynx as far down as I could see showed several wheals. The uvula was oedematous on the right side only, the situation of another wheal. Unfortunately, I had neither head mirror nor laryngeal mirror with me, but it is only fair to infer from the general manifestations of urticaria as well as the local ones in the pharynx and uvula, that the dyspnoea, cyanosis and prostration were produced by a wheal situated upon the epiglottis or within the larynx or trachea. Additional evidence rests in the sudden onset and simultaneous appearance of the urticarial rash with the dyspnoeic attack.

Adnephryn at once suggested itself as the remedy par excellence, but was not used because both the color and pulse were good and the patient evidently getting enough air, even though its passage was obstructed. Then, too, I feared that the irritation incident to any manipulation of the laryngeal structures might produce other wheals. A brisk purge of calomel and salts preceded by an enema was ordered. For the intense itching a pack of equal parts of milk and water with bicarbonate of soda and carbolic acid was applied, resulting in immediate relief.

I saw the patient an hour afterwards, the color was good, respirations about normal, pulse good, itching gone, but she was still quite nervous. The pharynx still contained a few wheals. The following morning the patient was normal except for a slight weakness incident to the catharsis.

California Bldg.

The Gates of Infection in Epidemic Cerebrospinal Meningitis.

N. Y. Med. Journ., Aug. 26, 1905.

This editorial calls attention to the interesting researches conducted recently by Westenhoeffer under the auspices of the German government. The results of twenty-nine autopsies made in the industrial district of Silesia, during an epidemic of considerably virulence.

The above observer finds that the invasion of the infections is through the pharyngeal tonsil. The latter was found enlarged, swollen, congested and oedematous in all the cases. The naso-pharynx was filled with a mass of muco-purulent material and the redness and swelling also extruded to the pharyngeal mucous membrane. The anterior portions of the nose was seldom involved. Either one or both middle ears were the seat of catarrhal or suppurative changes in 65½ per cent of all the cases. In 34 5/10 per cent of the cases the spheroidal sinuses were affected and in 27 6/10 per cent the maxillary sinus. In not a simple case did the infection find an entrance through the cribriform plate.

The moral of the above important observations is to clear the naso-pharynx of lymphoid overgrowth and to direct an aseptis to the nose and naso-pharynx during an epidemic of cerebro-spinal meningitis.

LEDERMAN.

A GUARDED BURR FOR SEPTAL RESECTION.

BY RICHARD H. BROWN, M.D., CHICAGO.

The writer desires to call to the attention of rhinologists, a new instrument for the submucous resection of the septum.

In his experience of seventy-two cases, he has found that, in a very large proportion, he has had to discard the bone-cutting forceps as either too large or too light to cut away heavy bone at the back of the septum, or high up, and has had to fall back upon the uncertain, and not always safe, method of twisting away the splintered fragments with a strong forceps.

Failing to overcome the mechanical difficulties in securing a cutting forceps of sufficient spread of jaws and strength to bite away

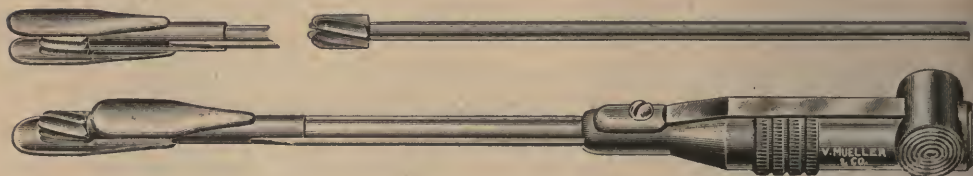


Fig. 1. The Guarded Burr complete, showing Slide drawn back, also Burr with Guards in position, and Burr withdrawn.

heavy bone, and still small enough to be inserted into the narrower regions of the nasal fossæ, he has had constructed for him, an instrument working on a different principle, which seems to meet the requirements.

It consists of a guarded drill or burr running in a steel tube sheath, which fits upon the ordinary White dental handle (Fig. 1.) The burr is oblong and especially adapted for rapid work. Half of the teeth extend to the rounded head of the drill, and two of these are cut deeply clear across the tip. The guards are arranged to project beyond either side of the tip of the drill, so as to prevent catching the membrane, and also to act as guides, being placed astride the part to be removed, thus preventing the rapidly-moving drill from slipping sideways. One of the guards is arranged to be drawn down to a second position without removing the instrument, leaving the burr free on one side to cut away bone too thick to be included between the two guards.

The instrument is small enough to reach every part of the nasal septum, and strong enough to drill away the hardest bone. The parts are easily detachable for sterilization.

The manner of using this instrument is obvious on reference to the cut (Fig. 2), but a few hints may save one some minor annoyances in the operation. The more rapidly the drill runs, the better. Any suitable motor with a flexible cable and White dental handle, will answer, or, one can use the ordinary dental engine

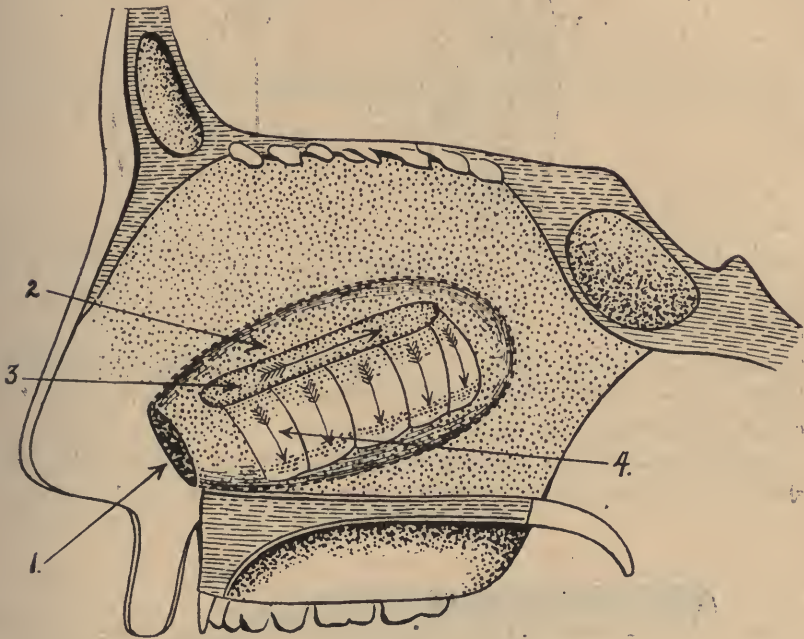


Fig. 2. Method of Operating the Brown Guarded Burr. 1 First incision in membrane; 2 Membrane elevated over deflection; 3 Upper part first removed by drill; 4 Body of deflection removed by downward sweep.

with foot power. In the writer's work so far he has used the Victor motor at its top speed.

After the membranes have been carefully elevated, this method is to insert a Foster submucous speculum (Fig. 4), which is best made about half an inch longer than usual so as to reach the furthest parts of the vomer if required. Through this retractor the guarded drill is passed and pushed backward astride the septum, cutting away a channel at the upper part of the region to be removed (Fig. 2-3), thus using the slower cutting point where the

bone is thinnest. Without removing the instrument it is withdrawn to the front of the cut, and with successive downward sweeps the bone is drilled away as far as desired (Fig. 2-4). Should one encounter parts too thick to be included between the guards, the movable slide is pulled back and locked, leaving the burr free to

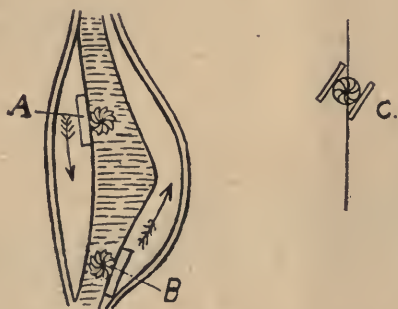


Fig. 3. Method of Operating with Slide withdrawn. A. on right side of septum; B. on left side; C. Method of avoiding wedging with thin splinter of bone.

cut away its thickness in the heavy bone guided by the other guard, then with the slide returned to its first place, the remaining bone is easily and safely removed.

When operating on a thickened septum with the slide back, care should be taken that the direction of the cutting should be such as



Fig. 4. Longer Foster Speculum.

to hold the bone against the guard and not to force it away, thus the burr revolves from left over to right, and in cutting on the right side of the septum (left side of the operator), one should cut downward (Fig. 3A). On the left side of the septum, cut from below (Fig. 3B). Failure to observe this precaution may cause the drill

to be violently jerked away from the bone to the possible injury of the membranes.

In cutting away thin plates of bone, the instrument should be tipped to one side so that the top and bottom of the opposite guards will hold the bone to the center of the drill (Fig. 3C). Otherwise a thin splinter of bone may become wedged between burr and guard and necessitate withdrawing the instrument to clear it.

For the removal of the bone dust, the writer has devised a small blunt hoe as shown in Fig. 5. On the other end of this is shown an



Fig. 5. Brown Hoe and Angular Elevator.

angular blunt elevator, which is not found in other sets of septum instruments, and is extremely useful in dissecting up the membrane behind sharp spurs or deflections.

Figure 6 shows the Freer sharp and blunt elevator in one instrument, which are used in elevation of the membrane.

A small syringe with sterile water or salt solution is also useful in removing the bone dust and detritus from between the membranes. The membrane is pressed back into position and the after treatment carried out according to the individual operator's custom.



Fig. 6. Double-ended Freer Dissector, Sharp and Blunt.

The writer likes to use a gutta percha splint packed against the membrane by gauze strips.

In operating on the cadaver, the writer has removed the whole septum including a large spur in a minute and a half. It has been used so far but twice on the living subject, and in these operations all the attention of the surgeon was given to consideration of safety, not of speed. Even when used without the presence of retractors, the guards have proven sufficient protection to preserve the membrane. It would seem to be the part of prudence to use a pair of slender retractors in the few cases where the Foster speculum can

not be used. Figure 7 shows one of the forms which can be used even in the narrowest places, and is found invaluable during the raising of the membrane.

In the second of the operations with this instrument, a very extensive resection, an unusually thickened vomer was removed with ease, to within half an inch of the choana, in such a position that no forceps heavy enough to do the work could have grasped it.

This guarded burr has not been devised as a universal instrument, though it can be used easily in place of swivel knife, chisel or bone forceps, in any part of the septum, but, if it should help others over some of the hard parts of this operation, the writer will feel more than pleased. This is presented as a preliminary pa-



Fig. 7. Modified Ingal's Spatula.

per, but I hope later to be able to report a series of operations with this instrument, when I can speak more definitely of its possible advantages and limitations.

The instrument is made in a most workmanlike style by V. Mueller & Co., of Chicago, to whom credit is due for the illustrations of this article.

72 Madison street.

THE REINFORCED FREER-GRÜNWALD FORCEPS AND NEW PATTERNS OF ELEVATORS AND RETRACTORS FOR THE SUBMUCOUS RESECTION OF DEFLECTIONS OF THE NASAL SEPTUM.

BY OTTO T. FREER, M.D., CHICAGO.

The forceps designed by me for cutting away the bony parts of deflections of the septum, my first description of which appeared in Fränkel's *Archiv. für Laryngologie*, Vol. 17, page 172, has been used by me for the past three years in all such submucous resections as included the excision of bone, and it has answered its purpose so fully that I have practically discarded for it all other implements for the removal of the bony portions of deviations, and I use it not only for the resection of portions of the perpendicular plate and vomer, but also for the excision of the bony ridge along the nasal floor, composed of the anterior prolongation of the vomer, the superior maxillary crest which supports it, and the crista incisiva anterior to it. Others operating according to my method have been similarly satisfied with this forceps.

While my statement in my first article, that the instrument was strong enough to cut away any thickness of bone encountered in the septum, has proven true in all but two or three of my cases; in these I have encountered bone at the base of the septum three-eighths of an inch thick, which the forceps would not punch through and which had therefore to be twisted with it in order to partly break it and partly cut it off. I have also had reports from two other operators, each with an instance in which thick bone resisted the forceps. It became necessary, therefore, to make this already powerful forceps still stronger, so that it could be trusted to always cut through even the thickest bone that might be met with in exceptional cases, and I have accomplished this by a very simple change which has doubled the cutting power of the instrument without depriving it of its good qualities of slenderness, length and freedom of opening in narrow places. The change alluded to consisted in making the shank of the forceps between the lock and the blades of a conically straight form as shown in Fig. 1, instead of concavely conical as shown in Fig. 2. The latter shape made the twisted bars composing the shank too

slender, so that when the instrument was firmly closed they sprang a little apart, power being thus lost. In the new "reinforced" forceps (Fig. 3) the jaws close with a firmness and a feeling of solidity that is due to the absence of all spring in the massive shank. The modification described has doubled the strength of the instrument, which now cuts through four thicknesses of heavy

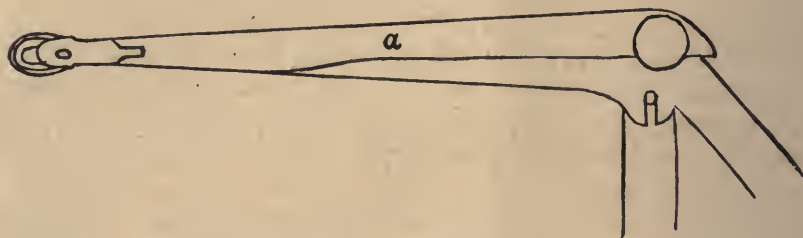


Fig. 1. a. New Reinforced Strong Shank of the Freer-Grunwald Forceps.

cardboard where it formerly cut through but two. The contrast in strength between the "reinforced" forceps and older pattern with slender springy shank is remarkable, the reinforced instrument cutting with a light pressure of the hand a thickness of bone which the old type of forceps could only be made to punch through when its handles were forcibly compressed.

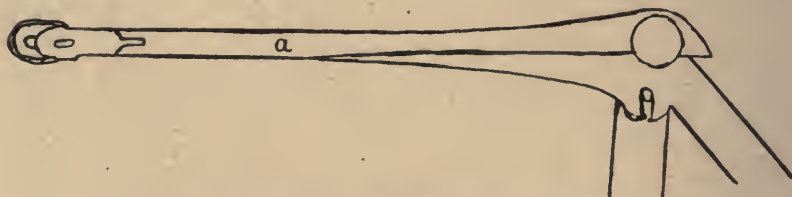


Fig. 2. a. Old Type of Concavely Conical, Weaker Shank of Forceps.

In former times, I paid undue heed to the frequent criticism that the instruments in my set for the submucous resection were too numerous, and, to its detriment, I discarded from it implements which further experience made it necessary to restore. Considering the great variation in the structure and form of deflections, it is quite impossible to do a perfect operation in every case without a large choice of instruments. The attempt to do fine cabinet work with a jack-knife may show zeal, but success is more

apt to attend the use of proper tools, and, similarly, the submucous resection, undertaken with "a few simple instruments," is apt to be poorly done as compared with the result obtained by a properly equipped operator. For this reason I do not hesitate, convinced of their appropriateness by use, to recommend as additions to my set the two short and two long elevators shown in Fig. 4. The short elevators, one sharp and one dulled, permit holding the instrument close to its working point, a great advantage in uplift-

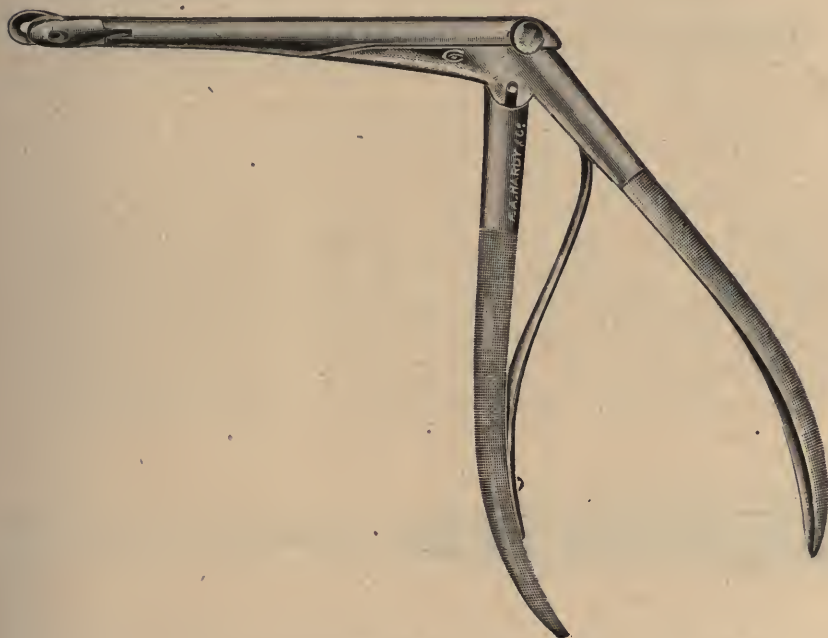


Fig. 3. The Freer-Grunwald Reinforced Forceps for the Submucous Resection of Deflections.

ing my anterior L-shaped flap and in working in the front of the naris. The long elevators, also one sharp and one dulled, are intended for detaching the coverings of the bony portion of the deflection far back in the naris. These four elevators are designed to supplement but not to replace the regular elevators of my collection.

Further experience with the submucous resection has confirmed my opinion that no form of nasal speculum can equal individual retractors, held by an assistant, for holding the nostril open or for holding aside the detached mucous coverings of the deflec-

tion. The saving of an assistant by trying to make a speculum held by the operator, or fastened to the patient's head, perform his services, is apt to prove an annoyance to the surgeon, to distract his attention and to compromise the success of the more difficult resections. A fault of the speculum is the parallel relation of its blades, which always keeps one of them opposite the other in

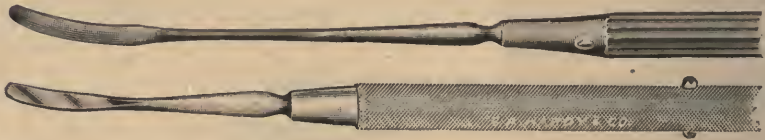


Fig. 4. Long Elevator for Use in the Deeper Parts of the Nose, and Short One for Working at the Front of the Nostril.

the naris whether it be in the desired place or in the way, as it is apt to be. The long-bladed type of bivalve speculum is objectionable where it is most needed, namely, for the resection of bone deep in the naris, for the close approach of its blades, due to the inability to open them widely in this region in most nasal cavities, leaves insufficient room for the play of the forceps in excising bone, so that opening this instrument, or its mere introduction in

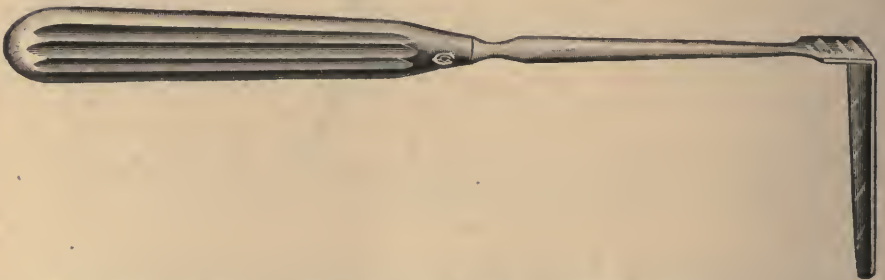


Fig. 5. Long, Thinbladed Retractor for holding aside the Detached Mucosa from the Denuded Deflection in the Deeper Parts of the Nasal Cavity.

some cases, forcibly crowds the speculum blades against the frail detached mucous coverings of the denuded deflection, so that they are apt to be torn. In distinction to the speculum, with its blades in unvarying relation to each other, the retractors may be placed in any relative position. If there be no room for two, one may be withdrawn, and in difficult work, near the front, three may be

used, one being held by the operator. The surgeon's attention is not distracted by having to hold a speculum in the proper position, for the assistant relieves him of the task of holding the nose open, so that the operator's left hand is free to swab or to push away endangered detached mucosa with an elevator, while the forceps is being used.

In order to hold aside the uplifted mucous membrane when the resection is being conducted deeper in the nostril, I have added to my set the long thin retractors shown in Fig. 5. Both of them may be used to hold open the pouches of detached mucous membrane on either side of the bony deflection, or, where there is no room for the play of the forceps between both of them, a not infrequent occurrence in spite of the thinness of their blades, only one may be used, it being introduced upon the side of the septum where the mucosa is most in danger of being seized. One of the retractors is also employed to protect the flaps during the tamponade.

I am indebted to F. A. Hardy & Co. for the uniform perfection in which they are making my forceps, which are now all of the reinforced pattern, and for the exactness with which they follow the original models of the rest of my set.

288 E. Huron St.

Suppuration in the Floor of the Tympanic Cavity. KRETSCHMANN. *Arch. f. Ohrenh.*, Leipzig, Oct., 1904.

In the case here reported, pus had burrowed from the mastoid cells through the posterior wall of the meatus, and had caused necrosis of the floor of the tympanum.

YANKAUER.

THE SAFEST METHOD OF USING PARAFFIN SUBCUTANEOUSLY.*

BY S. H. LARGE, M.D., CLEVELAND, OHIO.

In bringing this subject before you, I wish only to describe Prof. Gersuny's latest method of injecting paraffin subcutaneously. Gersuny was the first to use paraffin subcutaneously, and his method then was to inject paraffin which was at a low melting point, warmed, into the subcutaneous tissues. After he had two very serious complications, one of emboli of the lung, and the other of blindness, he adopted the method which I wish now to describe.

The site to be injected is made aseptic by the use of soap, alcohol and mercury bichloride solution. The syringes, two in number, one large and one small, are boiled, and the small one filled with Schleich's solution and the larger one with paraffin. The hypodermic needle must be made to fit both syringes. He injects the Schleich's solution under the tissues and then aspirates. If, in aspirating, the Schleich's solution remains clear, showing that no blood vessel has been entered, he attaches the large syringe containing the paraffin (which has been allowed to become semi-solid) to his needle, which has been left in situ. The paraffin is injected slowly, and great care must be taken not to inject too much at a sitting. The Schleich's solution also acts as a local anesthetic, thus making the operation perfectly painless.

I had the pleasure of attending Prof. Gersuny's clinic in Vienna last year and saw in use his paraffin for all kinds of deformities, also for very many different affections. Among these were the saddle-back nose, atrophy of the muscles of the face after the radical operation for empyema of the frontal sinus, inguinal and femoral hernia, incontinence of urine, and prolapse of the lower bowel. In a letter from Prof. Gersuny, which I received last month, he informs me that he has not had a single bad symptom follow this method.

In the last five years I have used paraffin subcutaneously in twenty-four cases in all, for the following deformities and affections: Saddle-back nose, depression after radical operation for

* Read before the Eleventh Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology, St. Clair, Mich., August 30, 31 and September 1, 1906.

empyema of the frontal sinus and in atropic rhinitis. I have never had any serious accident following, but when I look back I wonder that I did not, especially in those cases of atropic rhinitis where the paraffin was injected subcutaneously into the tissues of the inferior turbinate. The method I employed was the injection of the semi-solid paraffin, using the Harman Smith syringe. I have only used the aspirating method for the last six months, and must say that I feel a great deal safer after using this later method.

In reviewing the literature the following serious results have been reported:

Nosseriman reports a case of necrosis of the skin.

Hurd-Holden, blindness of the right eye due to emboli of the arteria centralis retinae.

Mintz, blindness of the right eye due to the same cause.

Pfarmaustiel, a case of pulmonary embolism.

Halban, a case of pulmonary embolism.

Kapsammer, a case of pulmonary embolism.

The only fatal one that I am able to find is that of Koffman, due to embolism of the lung.

To summarize: In paraffin, used subcutaneously, the rhinologist has a very valuable adjunct, providing that:

- (1) It is not used in the hot liquid state.
- (2) That it is injected according to Gersuny's latest method.
- (3) That too much is not injected at one sitting.
- (4) That all instruments, paraffin, and field of operation be made thoroughly aseptic.
- (5) That there be enough loose tissue at the site of operation to allow for the artificial tumor.
- (6) That in cases of atrophic rhinitis, the disease has not progressed too far.
- (7) That paraffin of too high a melting point be not used.

536 Rose Building.

SOCIETY PROCEEDINGS.
NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

Regular Meeting, February 27, 1907.

THOMAS J. HARRIS, M.D., CHAIRMAN.

PRESENTATION OF CASES.

**Case of Fibroid Tumor of the Laryngo-Pharynx Removed by
Sub-hyoid Pharyngotomy.** By WALTER F. CHAPPELL, M.D.

This patient was first admitted to my clinic at the Manhattan Eye, Ear and Throat Hospital in November, 1906, giving the following history: Age 51. No specific or family history bearing upon the condition. When a girl, had had a short, dry cough accompanied with slight expectoration. Five years ago her breathing became difficult, particularly at night, and was of such a character that her friends and relations thought she must be in great agony. Her doctor said she had bronchitis at the first visit, and subsequently told her she had a hardening of the vocal cords. This condition disappeared in a few days. Three years and a half ago a similar attack occurred, which was diagnosed as asthma, and from that time until November she persisted in not seeing a doctor, as she believed that nothing ailed her but asthma which was incurable. Two years ago she began choking when eating, and would occasionally vomit her meals. Walking fast or climbing would exhaust her greatly and produce a whistling character in her breathing. Only eight months ago her sleep began to be disturbed by her difficulty in breathing, but during the day she would frequently fall asleep in her chair, and this symptom increased until she would fall asleep in the midst of a conversation. During the latter stages of this condition she would apparently cease breathing during these naps and when awakened would take a number of deep inhalations accompanied by an agonizing wheezing noise. During this time there had been absolutely no pain, other than a headache in the morning. She did complain of dizziness and cough. There had been but slight loss of weight.

EXAMINATION. A large tumor of considerable size was seen occupying all of the upper laryngeal space and pressing the epi-

glottis closely upon the tongue. The surface was traversed by numerous connected blood vessels, which appeared to converge toward a central point on the left. A fair estimate of the dimensions of the tumor could be obtained upon probing, and its attachment was also determined to be on the left side, with an additional adhesion on the right. This second attachment rendered the possibility of removal by snare impossible, as an effort was made to remove it by this means. The patient was advised to submit to an operation for its entire removal, and a preliminary low tracheotomy was performed on November 30, 1906, under cocaine infiltration.

On January 4, 1907, the radical operation of subhyoid pharyngotomy was performed. The incision was made transversely through the skin and soft tissues just below the hyoid bone. The muscles directly in the way were severed, and the other tissues were retracted. The epiglottis was held forward and the growth exposed. The tumor was encapsulated and the capsule-pedicle was attached to the ary-epiglottic fold and was also adherent to the opposite hyoid cartilage—thus demonstrating the futility of removal by snare. The growth itself was shelled out of the capsule and the pedicle was ligated with silk—because of its vascularity and because chromicized catgut might not hold during vomiting—and then cut off with scissors. The wound was then closed with three rows of sutures, with drainage wicks in each angle.

Rectal alimentation was instituted for some days, at the expiration of which time the external wound healed and the stitches were removed. When the patient was permitted to swallow liquids, two small fistulæ developed in the wound and were getting larger, when the liquids by mouth were stopped and the wound closed immediately.

Several incidents occurred in the course of recovery which are worthy of note.

First. The tracheal tube was left out one day for over an hour and numerous unsuccessful attempts were made to reintroduce it. Finally a smaller tube had to be substituted and the size gradually increased to the former size.

Second. A bad bronchitis and tracheitis occurred.

Third. The patient's condition materially deteriorated in a room by herself, and she had to be removed to a ward with others about her.

Fourth. One of the silk sutures in the pedicle of the capsule remained in place and had to be removed. Chromicized gut would probably have been better.

Fifth. The absence of fruit acids in her diet produced scorbutus, which immediately disappeared upon giving orange juice in large quantities.

The tracheal tube was removed about two weeks ago, and since the closure of the tracheal wound the patient's voice has gradually been getting stronger, and her breathing is restored to normal. The patient can swallow liquids. Solids have not yet been tried, as there is still a little thickening around the posterior surface of the arytenoids.

DISCUSSION.

DR. MACKENTY said that in removing the tumor the fear of hemorrhage induced the operators to tie off the capsule en masse with silk, the ligatures being transfixed. It would have been much better to have removed the whole capsule, catching such vessels as bled. Then the edges should have been united. Nothing but absorbable material should have been used. In this way a quicker union would have been accomplished.

DR. SMITH said that during the time the patient was taking liquid food by a tube passed through the nose into the oesophagus, that two fistulæ formed in the line of the external wound; but immediately closed upon discontinuing this method of feeding. In the opinion of Dr. Chappell, equally rapid closure of the wound would have resulted had the external part been permitted to close by granulation.

Congenital Closure of the Choannæ. By F. C. ARD, M. D., Plainfield, N. J.

This patient applied for treatment some time ago with a history of difficulty in breathing through the nose. Examination showed closure of the posterior choannæ, which was bilateral, bony and complete. Through various devices a narrow opening has been secured on the left side, and the patient is now able to blow his nose and breathe through it to some extent. The right side has not yet been touched, as Dr. Ard wished the Section to see it first.

Protruding Incisors Remedied by Treatment. By E. A. BOGUE, M.D.

This little girl was presented to show the great change which can be produced in four months' time with very little attention on the part of the operator. A spreading apparatus was put into operation on the little girl's teeth October 27th last. It has now been operating exactly four months. When she first came the prognath-

ism of the upper front teeth was so great that by no possibility could the lips close over the teeth. Tonight she is not a bad-looking little girl, and she habitually closes the mouth, and I understand her to say that she sleeps with her mouth closed. Some months hence, when the articulation of the teeth shall have been completed, I shall send her to Dr. Berens, who examined her before I did anything, that he may report upon the condition of the nasal septum and passages. Then models as well as photographs will be prepared, so as to present the complete case.

Tumor of the Epiglottis. By S. W. THURBER, M.D.

The patient, a Russian, 59 years old, presented himself for treatment at the Vanderbilt Clinic with a history of cough, pain and sense of fullness in the throat for the last two months. Examination revealed a tumor on the lingual face of the right half of the epiglottis, about one centimetre in all diameters. It looked like a cyst, but was hard to the touch, and he was brought for the purpose of diagnosis. There were no glands involved in the pharynx or neck. Was it a cyst, fibroma, chondroma or sarcoma?

DISCUSSION.

DR. SIMPSON assumed that it was a question as to whether the growth was a cystic or a hard tumor. He had palpated it, which could be done very readily, and it was his impression that it was quite deep, and it seemed to be a dense tumor.

DR. THURBER said he had stated that it was a hard tumor on presenting him, but he did not know whether it was an organized cyst or some other hard tumor. He would remove it and report at a later meeting.

Primary Lupus of the Larynx. By EMIL MAYER, M.D.

Dr. Mayer said that he wished the Section to hear the voice of this patient and note his healthy appearance. This young man had applied at Mt. Sinai Hospital a fortnight previously with as little history as was possible for a patient to present. He had a very slight cough, and had been under the care of his family physician, who suspected that there might be some trouble of the throat, and a short time after he presented himself at Dr. Mayer's clinic. The upper portion of his epiglottis is swollen to many times its original size, ulcerated in the center, but the cords are in perfect condition. There is a very slight consolidation in the left apex of the lung. The diagnosis of lupus of the larynx was made for the reason that

an extensive lesion existed without any symptoms for many months. The diagnosis of primary tuberculosis was rejected because of the absence of symptoms, its slow duration, and also because of its improvement in a short time, and its possible prognosis.

With a diagnosis of lupus, the young man has a good chance of recovery, at any rate for the present.

DISCUSSION.

DR. MAYER said that Dr. Freudenthal had asked why he did not call this a case of primary tuberculosis. There is a very important clinical difference. If it were tuberculosis, the patient ought to have temperature; there is none. He ought to have a great deal of difficulty in deglutition, and the prognosis would be very grave indeed. A case of primary tuberculosis of this kind would mean that he would probably die within the next three or four months, and at the same time the amount of his general debility would be great. Instead of this, he is fairly healthy looking, has no pain and no temperature, and the prognosis as to his ultimate recovery is fairly good. He may die of tuberculosis, but he should live for years before doing so. He had had two similar cases, one of whom lived for six and the other for eighteen years after a diagnosis of primary tuberculosis. Before next month he hoped to have this patient many miles away.

DR. SIMPSON inquired whether the diagnosis had been made without a microscope, and Dr. Mayer replied "yes"; he had made the diagnosis right away, and had passed the patient around among his assistants, as a case of lupus of the larynx. A smear was examined and found to contain no tubercle bacilli, but the portion excised for examination showed them.

DR. FREUDENTHAL said that the question of the diagnosis was not clear to him even after the explanation. If such a case which showed no lesion of the lung was called lupus, the diagnosis seemed peculiar; he himself called such cases tuberculosis. He had seen many similar ones with no lesion of the lung; and he had had such cases which had been cured for twelve years, but he did not call them lupus. They looked to him in every respect like tuberculosis. He had a young man under his care now who has a much deeper ulceration on the epiglottis than this case, though it looks very much like it. The patient was surprised when the lesion in the larynx was discovered, as he knew nothing of it.

DR. MAYER said that all who have studied this question agree that there is a distinct difference between a primary lupus of the larynx and a primary tuberculosis, and he suggested that Dr. Freudenthal should class such cases as were very slow and insidious in their action as primary lupus of the larynx.

Papilloma of the Larynx. By W. W. CARTER, M.D.

Dr. Carter said that he presented this case not as being an unusual condition, but as being a very unusual development of a common condition. It was the largest papilloma of the larynx that he had ever seen, and several men of wide experience had said the same thing. The patient was a young woman of 24, and for the last five years she has noticed a progressive loss of voice. During the last year she has suffered considerably with dyspnoea, at first only after exertion, but now constantly. This growth comes from the upper portion of the right vocal cord near the anterior commissure, and almost fills the ventricle. It is so large that during inspiration it almost excludes the air by its ball-valve action. The growth is pedunculated, and one might be tempted to use a snare, but there is some danger of its being drawn into the trachea. Probably the safest manner of removal would be by the forceps.

Nasal Syphilis. By W. FREUDENTHAL, M.D.

Dr. Freudenthal said that he thought this case would be interesting in connection with the other cases presented this evening. The patient is 21 years old and presents this defect on the ala nasi, and says he has had it since his second year. It may be hereditary or due to some accidental cause. There were no other syphilitic lesions present. Dr. Freudenthal said that he would be glad to have suggestions from any of the members present.

Congenital Occlusion of the Choannæ, with Report of Two Cases.

By JOHN E. MACKENTY, M.D.

DISCUSSION.

DR. MAYER said that in order to have the references to the literature as accurate as possible, he wished to call attention to the fact that Dr. Asch reported a case of double occlusion of the bony palate in a young man 25 years of age, some fifteen or sixteen years ago, either in the *Transactions of the American Laryngological Association* or in one of the New York journals. It was at a time when the electro-trephine was not so well understood as now, and Dr. Goodwillie, who knew more about it than most at that time,

was called in to help use the trephine in going through the bony plate of the patient. That was before the days of cocaine, also. Soon after this another patient had been referred to Dr. Mayer by a colleague, who was very desirous of having the patient's bony plate punctured. Rhinoscopic examination showed that there was some malformation of the base of the skull, and if any attempt had been made to go through the plate the brain would probably have been entered. Dr. Mayer said that he called attention to this as a diagnostic point of interest in connection with the cases shown tonight.

DR. SWAIN said that, curiously enough, before coming to the meeting, he had prepared some remarks which he hoped to make after the reading of Dr. Bogue's paper concerning this question of congenital atresia, before receiving the notice of Dr. MacKenty's paper, but he would like to know whether Dr. MacKenty had had any trouble in reaching the bony plate, and whether Dr. Ard had made any measurements in his case.

DR. ARD replied that he had not yet made any measurements, but that he intended to do so.

DR. SWAIN said that he had two cases which he would measure and report later. In a case upon which he is now working he experienced great difficulty in getting at the plate. In one of the cases which Dr. MacKenty had reported, the inferior turbinate had to be removed. He doubted very much whether he could get his case completely well without taking away some of the inferior turbinate, which in his case was decidedly overgrown instead of atrophic, as one might have been led to expect *a priori*. The removal of a bony plate had been very much helped by the use of the Fetterolf saw or file.

DR. SMITH said that some five years ago he had seen the first case mentioned by Dr. MacKenty, and had thought that one side of the nose was occupied by a solid bony core, rather than by a plate of bone occluding the post-nasal space. He had seen this case again quite recently and was much impressed by the great improvement in the general appearance and facial expression of the patient.

DR. MACKENTY said that, in a paper so short, all the reported cases could not be given in detail, nor the names of all those reporting cases be mentioned. He had given the number of cases and the names of the principal reviewers. In the two cases operated he had no trouble removing the bony plates with specially

constructed dental drills, although in one case there was a complete occlusion to within half an inch of the anterior opening. This was due to ecchondroses of the septum and required removal before the bony plate could be reached. Here the inferior turbinate was not removed. He could not conceive of a case where removal of the inferior turbinate would be justifiable. It would be better surgery to remove the septum. The consequences of removing the inferior turbinate are too well known to rhinologists to require mention.

The Relation of the Dental Arches to Pathologic Affections of the Naso-Pharynx and Adjacent Parts. By E. A. BOGUE, M.D.
(*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)

DISCUSSION.

DR. SWAIN said that he could not too strongly endorse the remarks of the Chairman in commenting on the advantages of the mutual discussion of questions in which the work of others bears upon our own, and that Dr. Bogue's paper was a valuable illustration of this. Before coming to the meeting he had read Dr. Bogue's paper and had had some time to think it over, and what particularly impressed him was the fact that there has always been a weak spot in the reasoning as to why the palate over-arches. Something has seemed lacking all the time, but he believed that Dr. Bogue had supplied this missing link in his emphasis upon the position of the tongue. And, while upon this point, he hoped that from now on every member present would protest against the pictures in our text-books where vertical sections of the head are given with the tongue lying far removed from the roof of the mouth, so that if the picture were enlarged to life-size the distance between would amount to nearly an inch. This is perfectly absurd, for they should be shown as in contact. If we would not only bear this in mind, but think of the power of the tongue against the roof of the mouth, we would better appreciate its influence in broadening and widening the palate.

The first time it occurred to him that the established opinion in regard to the growth and development of the palate was not correct was in seeing three or four children, with whom he was well acquainted, having the mouth arch before they had been guilty of adenoids or of a short period of mouth breathing. In talking over this matter with Dr. Jonathan Wright, he suggested that it might be well to study the mouths of the skulls of a non-adenoid race as compared with Europeans, who have, as we know from the evi-

dence of pictures, suffered with adenoids for centuries. If adenoids are so potential in palate over-arching, we who have had them for centuries should have a higher arch than the races who have never had them.

The measurements of Hawaiian skulls showed that their arches differed but little from our own index. While doing this measuring, there came into his office one day a Yale student, the descendant of an original Hawaiian, and he could not refrain from commenting on his beautiful arch, saying at the same time that he had seen many such in the museum. The man then suggested that the method of treating the young babies in the Sandwich Islands might have some influence in the matter. When the infants there have a coryza or a bad rhinitis, the mucus is removed by applying the lips to the nostrils and sucking it out. This duty was usually performed by the grandmother, and certainly demonstrates that those in the Sandwich Islands, as elsewhere, are ever a self-sacrificing class.

Dr. Swain said that it then occurred to him to note what happened to the septum nasi when other influences than adenoids altered the shape of the palate. This led to the study of the Flathead Indians, and it was found that the binding of the head did broaden the arch and diminish its actual height. The actual distance from hard palate to base of skull also was shortened, leading to the question of how the septum behaved under these conditions. Observations in this direction showed that it did accommodate itself. They had no more frequent bends from above downwards than other races. The Flathead septum accommodated itself to circumstances. Why may not the European skull do the same? It may in time.

The next question studied was whether the presence of adenoids in the child always produces a raising of the arch and bending of the septum, and the observations brought out the fact that it does so frequently, but not always. It is possible to have well-developed adenoids in a person with a broad arch and have it but slightly narrowed by them. If a child is about to develop a narrow and high arch, this change will be very much greater if adenoids persist long in the naso-pharynx. A raised arch always means more or less bend to the septum, as it hardens the last of the nasal bones.

Then Dr. Bogue's theory meets the case of those who have a greater nose and a broad breathing space. There would not be much obstruction in such a case. The tongue is held up against

the roof of the mouth and the arch is preserved. Dr. Swain said that he had supposed that the preservation of the dental arch had much to do with whether the child kept a normal palate arch; that if the dental arch, or horizontal arch, was preserved, the arching would not be so great, and the vertical arch would be kept as it should be.

With reference to the experiments of artificially shutting up of one nostril in animals, Dr. Swain said that he did not believe that they represented conditions in the human economy. In observing a recent case of congenital atresia he had reached just the opposite conclusion, namely, that it has but little effect upon the actual shape. Dr. Coolidge, of Boston, relates similar observations in congenital atresia. In this instance of Dr. Swain's, one side has been stopped up since birth, and that side is larger and broader than the other, has the larger turbinates and the greater air space. The child is now 10 years old and has a very perfect dental arch with only slightly heightened palate arch.

Another point upon which Dr. Bogue's paper shows the importance of other side lights upon our work is the fact that the ortho-dontist does produce results. He not only makes a beautiful scientific conception of what ought to be done, but he does it. He broadens the arch, brings the teeth into line, increases the nasal space, and gives the teeth a chance to grow. Dr. Swain concluded by saying that he hoped the combined work of the rhinologist and the ortho-dontist would have something to do with producing a better race who would breathe through the nose.

GEO. H. WRIGHT, D.M.D., Boston, in discussing Dr. Bogue's valuable paper, "The Relation of the Dental Arch to Pathologic Affections of the Naso-Pharynx and Adjacent Parts", said: I beg to offer as a supplement to that paper some hitherto unrecognized factors which induce those pathological affections referred to. This is given through the courtesy of Messrs. P. Blakiston's Son & Co., Publishers, and Professor C. N. Johnson, editor of a new book on "Operative Dentistry," now in process of publication, for whom I am writing the chapter on "Oral Hygiene" and of which this is a part.

Long before the malocclusion of the teeth and contracted dental arches, there are physiological processes in the development and eruption of the teeth that lay the foundation for subsequent malformations whenever there is a modification or interference with the normal physiological process.

Why do teeth erupt? In our endeavor to answer this question, we shall lay especial emphasis upon certain factors, as pulsation of force from *blood pressure*, that impels and moves the tooth onward out of its crypt and through the gum tissue. Any interference in this process, induced by unnatural external causes, may so modify the direction of the eruption of these teeth as to cause not only reflex disturbances of digestion, with many other manifestations of pathological diseases, but may so modify the superstructure of the superior maxilla as to cause decided malformations in all the facial bones, including the floor of the nasal fossa; the nasal septum and the antra; and may induce abnormal growths, thickenings of mucous membrane, such as adenoids and other obstructions that disturb normal functioning.

Frequently the physician called to attend a child who is disturbed in the process of teething, so-called, will indiscriminately lance the gum, a fibrous tissue immediately over the erupting crown, and in that manner seek to give the child relief. He may succeed temporarily, but frequently the tooth is not sufficiently developed. It is then held below the gum for an abnormal length of time, and longer in most instances than if the gum had not been lanced, and the cicatrix heals rapidly and histologically will exhibit a denser fibrous mass, considerably matted, and very resistant, and very difficult for the erupting tooth to cut through. The immediate result of this retarded eruption may be observed in a decided deflection of the lines of growth, not only of the alveolar periosteum, but also of the adjacent bones. In the region of the intermaxillary bones, where the central incisors have been held for an abnormal length of time, the rest of the structure immediately above will suffer a corresponding retarded elongation. This may be observed in a later bending, or buckling, of the nasal septum, thereby closing on one side the nasal fossa, and on the other exhibiting a very wide opening.

These deformities have their origin, during the period of and particularly after the eruption of the first teeth; later the arch of the teeth, or substructure of the superior maxilla, loses some of its units of strength in supporting this structure, because the points of contact of the temporary teeth are unequal. Undue pressure is brought to bear at isolated points in the closing of the mouth, with the reflex result that there will be distortion in the structure above. The permanent teeth, which are developing immediately following the temporary teeth, continue this tendency to deformity, and the

process may go on up to 12 years of age. In the meantime some enthusiast for early extraction may further complicate this deformity by the removal of some of these teeth malplaced, and at this point we find one of our greatest complications, as it leads to an abnormal, unhygienic condition of the mouth. Triangular spaces are formed into which are lodged accumulations of detritus difficult to remove, and in consequence there follows in its train most of the destruction of the teeth through caries, impaired digestion and imperfect respiration.

We know that the crown of enamel, with its interlining of dentine, is formed first, and subsequently the dentine thickens and elongates; then it becomes covered with cementum and ultimately the root or fang is developed with its covering of peridental membrane. But this completed growth is not a necessity for the eruption of the tooth, because we find upon dissection of the jaws, from 6 months up to 6 years, that the teeth erupt frequently without a vestige of a root, and, consequently, the disturbances within the oral cavity, and reflected in impaired digestion of the child—to be described in detail later—are not “due to the elongation of the root and consequent pressure upon the developing jaw,” but to some other cause. *Nor can we find histologically the so-called absorptive organ between the gum and crown.* In this region we find many osteoclasts which undoubtedly are the active agents in absorption, but no distinct organ.

The erupting tooth of a child slowly develops to the surface after absorption of the alveolar periosteal crypt immediately above the crown, and ultimately cuts its way through a fibrous mass of gum tissue. It is hastily assumed that all possible disturbance with that particular tooth has ended, but observation will show that the tooth is not firmly embraced and it may disappear below the gum into its crypt, leaving a small orifice capable of lodging decomposing food and myriads of bacteria.

If our observations regarding the blood pressure preceding and after the eruption of the tooth are correct, it is safe to assume *that blood pressure has been a potent factor in the primary process of eruption*, long before it has reached the surface through absorption of the walls of its bony crypt. If, during this early process before the appearance of the tooth, or the congestion of the fibrous gum, there should be from any cause whatever an undue localized tension, then the disturbances noted in the young child may be accounted for, although there may be no external evidence of the teeth.

There may be a feverish restlessness, periods of excessive salivation, desire of the child to bite its fingers, and rub its eyes and nose. There may be bright red areas in the region of the parotid and sublingual glands externally; possible rise in temperature with fretfulness and nervous irritability, and reflex disturbances of digestion with frequent ejections of its food. The mucous membrane of the mouth, under these circumstances, may exhibit a hot and dry surface that lasts for a few hours, to be followed by salivation.

The etiology of these disturbances, in the majority of cases, may be referred to improper feeding, as indifferent formula for artificial foods, too much food, uncleanness or indiscriminate feeding.

It must be borne in mind that there is a tremendous structural upbuilding during the period of eruption of the teeth. Nature is elaborating forty-eight teeth, whose growth and position subordinate and determine the form and size of the facial bones, the nasal septum, the floor of the nasal fossæ, elongation of the antra, etc.

Frequently a child from 4 to 6 years will either, through an accident lose the central temporary incisors, or loosen them by the habit of prying a pencil between the teeth, and soon they are removed by the child, parent, or dentist. At this period in the development of the permanent central incisors immediately following the temporary incisors, we find only the broad crown of the enamel *and no roots*, and the crown situated high up in the intermaxillary process.

The too early extraction of the temporary incisors in the superior maxilla, from whatever cause, may induce malformations in the floor of the nasal fossæ and adjacent structures, because the permanent central incisors are held by a new deposition of alveolar bone and a denser fibrous mass of gum tissue, and finally lack of power through the vascular pulp of the tooth that would normally impel it onward and downward; because being held in place the dentine thickens; the roots elongate, and the apical region of the tooth becomes more constricted, thereby closing what was formerly a wide area of pulsating vascular tissue which was the primary impelling force.

All the structures immediately adjacent to the teeth and jaws during the early years of development are susceptible of every movement and direction. This fact being recognized, we should the more readily appreciate the wisdom of leading the temporary teeth into harmonious relations as indicated by Dr. Bogue, and in so doing avoid the possible necessity for the later regulation of the permanent teeth.

I thank you, Mr. Chairman and gentlemen, for the courtesy, and will conclude by presenting a few slides which are photographs taken of dissected skulls showing the actual status of the teeth and their roots in relation to the maxillæ from birth to the adult; also some injected vascular pulps showing the enormous blood areas within the newly developed tooth that provides the force to impel its eruption

DR. NEWTON said that he presumed Dr. Bogue had asked him to take part in this discussion because the little girl who had been presented in this discussion was a patient of his. He had found her going about with very prominent and unsightly incisor teeth and had asked the family what they were doing for her. They replied that they had taken her to a dentist, who proposed to extract the teeth. Dr. Newton then persuaded them to send the child to Dr. Bogue. Under his treatment she was so improved in a couple of months that Dr. Newton did not recognize her when he saw her in the street. Her teeth originally stood out like the cow-catcher of a locomotive, and had been the first thing one would notice as soon as the child came in sight.

There were many things that he would like to speak of in regard to the development of the teeth and the hygiene of the mouth, but there was not time. He thought, however, that we are too much inclined to attribute our remediable defects and peculiarities to the Almighty. When we have irregular arches and protruding teeth, we give names to these conditions and talk about V-shaped arches and saddle-shaped arches, etc. Dr. Bogue is going to remedy all this when he broadens and regulates such arches, and we hope that this will help us to do away with our idiots. Dr. Edouard Seguin showed the way to lighten the clouds which surround these unfortunates, and by developing their bodies he developed their brains. Dr. Bogue is working in the same direction. It will unquestionably have a beneficial effect upon brain development when we get better dentition, and a better dental arch for the average man will give better citizens and better all-around men.

Dr. Newton had been much struck by what had been said of the rarity of adenoids in tropical climates and their comparative infrequency in the Hawaiian Islands. He supposed that this may be mainly due to the fact that in tropical countries the inhabitants get purer air at night in their dwellings. In Greenland the air breathed by the natives is bad. There is little or no ventilation and the air in their huts is contaminated by the fumes of burning

oil and so on. He had little doubt but that the adenoids of the New England children are partly due to the fact that all good air was sedulously kept out of the bed-chambers. In the old houses of fifty years ago the air was very bad. The old habit of sleeping with the windows battened down was a principal cause of consumption in our New England ancestors, and in the same way want of pure air at night causes adenoids and consumption in Greenland and among the Esquimaux.

It has been claimed that the prevalence of adenoids is largely influenced by the food habits, and, while the question cannot be decided offhand, there seems to be little doubt that the superheated dry air of our dwellings is an important factor in their causation.

We know that every man carries microbes around with him which may become active at any time, and this activity may be aggravated by decayed teeth. In Brookline, Mass., where they have a very good system of inspection of school children, out of 700 children examined, only 23 per cent. had good teeth, 25 per cent. had fair teeth, and 50 per cent. had carious teeth. In Andover, Mass., the school children's teeth were examined and compared with their weights. The children were divided into groups from 5 to 14 years of age, making twenty groups in all, and the boys and girls were considered separately. In fifteen of these groups the children with good teeth surpassed in weight those with poor teeth by an average of 2.7 pounds per child. This agrees with the results obtained by hygienic studies in the Chicago schools, where the children's standing in their classes improved in direct proportion to their weights, the stronger and heavier children surpassing in scholarship the weaker and lighter ones.

Dr. Newton said we cannot overestimate the value of a study of the anatomy and physiology of the process of dentition such as Dr. Bogue has undertaken. Thousands of ills seen and unseen come from poor teeth, misshapen jaws and inadequate breathing facilities. Personally he felt that Dr. Bogue has put the medical profession under a deep obligation by his simple and lucid demonstration of a method for correcting the innumerable dental irregularities of our children.

DR. SIMPSON asked that Dr. Bogue, in closing the discussion, would bring out more fully the subject of broadening the dental arch. Will that necessarily relieve the deformity of the septum, and in the subsequent growth of the face will the septum remain comparatively straight.

Dr. BOGUE replied that he understood Dr. Simpson to ask whether the broadening of the dental arch will necessarily result in the straightening of the septum. He thought it would if the broadening were done sufficiently early. One does not, however, dare to be dogmatic at this stage of the work, for this result has only been noticed a little over five years and normal articulation a little over 25 years, and the relation existing between them has hardly been sufficiently investigated. It has only been studied for six or seven years, and five years ago he himself knew nothing about it. Since then he feels he has learned a little. Dr. Swain had brought out some very important points in his discussion of the paper. What he calls "the missing link," namely, the tongue, has not been looked upon as a very mighty influence in the direction of forming the dental arch, and yet the speaker feels convinced that the emphasis put upon it in the paper is not too great. Dr. Pedley of Rangoon, Burmah, read a paper before the British Medical association in 1905, in which he described 19 cases occurring in his own practice where, according to him, great deformity of the superior maxillary was caused by bottle feeding. Dr. Pedley ignored the influence of the tongue and ascribes to the rubber tit the prognathism that resulted. Insufflation is one of the influences and the dragging of the muscles, which have often been commented upon, and doubtless others.

Dr. Swain also inquired whether the preservation of the first teeth until the eruption of the second teeth has much to do with the preservation of the arch. It certainly has, and there can be no accurate articulation of the upper and lower teeth unless the entire number be present, and unless all of the temporary teeth are preserved there will not be sufficient room for the permanent teeth to erupt in. Dr. Bogue said that he was glad this question had been brought up, for both parents and dentists pay far too little attention to the preservation and health of the first or deciduous teeth. Unless these are preserved until their roots have been entirely absorbed the child is almost sure to have irregular permanent teeth, and if they are irregular then a series of evils follows. The question has been brought up as to whether all our teeth wear down as we grow older and become ill-fitted for grinding or trituration. It has been shown very conclusively, though perhaps not in any text-book, that an absolutely normal arrangement of the permanent teeth will result in a continuation of the triturating power to the last, though it be three score years and ten, and another ten

added to that, for the reason that the hinge of the jaw from the glenoid fossa to the symphysis of the chin forms such a curious contrivance that when the articulation of the teeth is complete the wear is uniform, and owing to this the teeth remain sharp to the end of life; but let never so little malarticulation occur, from whatever cause, the wear becomes one-sided, the cusps wear off, and there is a malapproximation of the teeth which causes the jaw to come forward; then comes wear upon the incisors, which causes the condition that we hear called "double teeth all around," which simply means teeth worn down. This point is a little off the line of discussion, but is very cognate to it. Dr. Swain had spoken of the orthodontists getting teeth into line, but an important point neglected by many of them is the procurement of accurate occlusion, which requires the entire set of all the teeth to make an absolutely normal closure.

Two Cases of Fracture of the Larynx. DR. MICHEL. *Rev. med. de l'Est.*, Jan. 15, 1906, No. 2.

Michel reports two cases of fracture of the larynx following traumatism of the neck. The first patient, who had an incomplete fracture of the thyroid cartilage, was completely cured. The second, however, to prevent asphyxiation, had to be tracheotomized and retained in consequence some hoarseness, of the voice and also some difficulty in respiration. The patient, however, refused surgical intervention for the relief of this condition. Michel advises that in such cases thyrotomy ought to be done to re-establish perfect coaptation of the fragments.

SCHEPPEGRELL.

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY.

Regular Meeting, February 19, 1907.

J. HOLINGER, M.D., President.

PRESENTATION OF CASES AND INSTRUMENTS.

Case of Closed Ethmoid Sinusitis. By H. KAHN, M.D., and MORTIMER FRANK, M.D. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)

Case of Necrosis of Lachrymal Duct. By W. L. BALLENGER, M.D.

The patient, a girl eleven years old, had scarlet fever seven years ago, and following this suffered from sinusitis. One year ago there appeared a bulging of the side of her nose, and again last winter. I operated two months ago, and found a large area of necrosis in the region of the lacrimal duct, and including the anterior and posterior ethmoidal cells. It was removed and the anterior and posterior ethmoidal cells were exenterated, and the middle turbinal removed. Granulation tissue was removed from the sphenoidal sinus. The other side was operated on in the same manner, but intranasally. The skiagraph showed great density through the ethmoidal region, on both sides, and absence of both frontal sinuses probably because of her youth. There is still some discharge from the right side.

Case I. Bronchial Asthma due to Sinusitis.

Case II. Tubercular Ulcer in Connection with a Dehiscence of Nasal Bones and Frontal Bone. By J. HOLINGER, M.D.

CASE I. Mrs. M., age 20, suffered from asthma since her fifth year. At her first examination she showed the typical picture of bronchial asthma which I do not need to describe here. There was a considerable amount of pus in both nostrils, more, though, in the left middle duct. A systematical rinsing by means of Sielenmann's canula of one cavity after another revealed ill smelling pus in a cavity which was reached by inserting the canula laterally and about one centimeter behind the anterior end of the middle turbinal. The asthma improved and did not bother her throughout the fall and the first half of the winter.

In the middle of January it appeared again, and we decided to operate radically. On entering above the median end of the left

eyebrow, a large sinus was uncovered, reaching from beyond the right incisura supraorbitalis to beyond the left one, and opened into the *right* nostril. No pus, but thickened lining was found. On removing the floor of this sinus foul smelling crumbs of pus were noticed. They were removed together with the polypoid degenerated lining from a flat deep cavity in the roof of the orbit. Both cavities were drained into the left nostril. The patient made an uneventful recovery, and today, two weeks after the operation, you can barely notice the scar. No trace of asthma has shown since, and she feels stronger.

CASE II. An ulcer the size of a penny with undermined margins is located in the skin above the inner corner of the left eye. The root of the nose is swollen and upon pressure on the swelling and on the ulcer a drop of pus appears at a birth-mark which is located near the lower end of the nasal bones in the middle line. It looks like an enlarged hair follicle. At the operation, the skin was found undermined in all directions from the birth-mark. The ulcer was connected with the fistula. The fistula led to a cleft of about one-half a centimeter in width between the nasal process of the frontal bone and the nasal bones. Nowhere could raw bone be felt nor could any communication of the cleft with the surrounding sinuses or the nose be discovered. The wound was curetted and closed. It healed nearly throughout by primary union.

The question of interest is that of etiology. A tubercular ulcer in connection with a congenital fistula, even the fact that the ulcer developed more than an inch from the opening of the fistula, has been repeatedly described. But the cleft in the bone was certainly not of a tubercular nature because there was no raw bone in the cleft, no granulations, the lining of the cleft was periosteum. The cleft was not filled with connective tissue. It could not be a scar of a former injury. The only explanation is that of a congenital malformation. As such it can not be compared with cleft palate, which is due to a defect in development along the lines of embryonal clefts, for the simple reason that there are no embryonal clefts in this region. The nose develops as a median protrusion of the forehead. The patient has her own explanation of the birth-mark, which was given to her by her mother. She says that her mother saw a man with a broken nose at an early period of her pregnancy with her.

The question of the effect of maternal impressions upon the child is a difficult one. The present case seems to confirm the possibility of such influences.

Four Mastoid Cases. By NORVAL, H. PIERCE, M.D. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)

An External Splint for Lateral Deviations of the Nose. By ALBERT H. ANDREWS, M.D.

The splint exhibited consists of a piece of sheet aluminum about six inches long and one-half inch wide at one end and one inch wide at the other. It is so bent as to make a bearing with the narrow end on the convex side of the nose, while the broad end is applied to the opposite side of the face on back of the malar bone. The bearing surfaces are roughened with tooth-like projections for catching into the collodion dressing to be first applied to the skin. The splint is shaped to fit the face in each individual case. The cases in which I have found this splint useful are those of accidental fracture of the nasal bones, with a tendency towards deviation, and cases of congenital or acquired deviation in which an effort is made to correct the deformity. In the latter class the nasal bones are first fractured with a mallet and block of wood. It has been my practice to fracture the concave side of the nose first, and then the convex side. After placing the nose in the median line, or a little to the opposite side from the former deflection, the splint is applied and held in position by cotton and collodion. A layer of cotton is pasted to the skin with collodion at the points where the bearings are to be. Then the splint is placed in position and held by another layer of cotton and collodion applied to the outer surface of the splint, and extending well over its margins. The splint is thus held firmly in position with no tendency to loosen from the cotton, or for the cotton to loosen from the skin.

When the pressure required is slight, the splint may remain six or eight days without changing. But I have found it better to change more frequently—usually every second day. When the splint has remained too long in position without changing, some irritation of the skin has been noticed. When this occurs the shape can be so changed as to make pressure on a slightly different place. The use of the splint should usually be continued from eight to sixteen days, cases of accidental fracture requiring the least time. When it is desirable for the patient to wear the splint about his daily work, appearances may be improved by covering the exposed metal with surgeon's plaster.

The points of special importance are : *First*, that the bones shall be well loosened, and that the nose remain in proper position when

so placed with the fingers. *Second*, that the splint be properly shaped to the face and pressure evenly distributed. *Third*, that its use be continued sufficiently long for the fractured bones to become firmly attached in their new position.

Demonstration of Dr. Sidney Yankauer's New Method of Operating on Turbinal Hypertrophies. By HERMAN STOLTE, M.D.
Milwaukee.

Dr. Stolte described and demonstrated Dr. Yankauer's new method of resection of the hypertrophic parts of the lower and middle turbinated bodies, followed by a complete intranasal suture of the wound edges, from the posterior extremities up to the anterior border, in order to secure primary union of the wound. The new method was demonstrated by the inventor, Dr. Yankauer, on the 22nd of January, before the Academy of Medicine in New York, but was not to be published in *THE LARYNGOSCOPE* until the middle of March. The ingenuity of the method, representing a real progress in surgery on the one hand and the difficulty of the technic on the other, fully appreciated by Dr. Stolte when the method was privately demonstrated to him by Dr. Yankauer on the 17th of January, evoked in Dr. Stolte the wish to communicate this new method as soon as possible to the Chicago rhinologists by a personal demonstration, especially of the intranasal suture and the use of the instruments in order to make the later publication of Dr. Yankauer's article in *THE LARYNGOSCOPE** more comprehensible and thus to awake the desire to try the operation as soon as possible, so that the newly gained experience of others would help to improve the technic by individual suggestions. Dr. Stolte had tried the operation in two cases and came to the following conclusions:

"The operation is possible only in cases in which the swell body of the lower turbinated body forms the chief part of the obstruction, to be judged of after the use of adrenalin application. In cases in which the hypertrophic and enlarged bony frame of the turbinate is resting against septum and floor the operation is scarcely possible. Only a full response to adrenalin, giving a consequent free operating field, enables us to operate. A constant and free oozing makes the execution of the intranasal suture impossible.

The instruments so far known for the execution of the first step of the operation, and especially for the subperiosteal or submucous resection of parts of the bone, are too clumsy and need technical improvement in order to shorten the operation. In the meantime

* *THE LARYNGOSCOPE*, No. 11, Vol. xvii, page 105.

Dr. Yankauer devised a very suitable, slender scissors which is so delicately built that it does not obstruct the view, but on the other hand possesses the very strong joint of Myles scissors, enabling us quite easily to cut off the soft tissues and bone. In order to detach the web body from the bone, Freer's straight and curved septal elevators proved also to be very useful.

The operation carried out in suitable cases represents a great progress in nasal surgery, as resulting in primary union within three or five days, it does away with all the numerous annoyances and drawbacks (secondary hemorrhage, infection, suppuration, granulating wound surface, very prolonged healing process resulting in the formation of cicatricial tissue in place of normal mucous membrane) of the older methods, which appear in reality crude and primitive in comparison with the precise, exact and scientific new method, being strictly in accordance with the best principles of modern surgical technic.

Case of Oto-Sclerosis. By GEO. E. SHAMBAUGH, M.D. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)

Case of Deformity of Nose from Sequestrum. By J.C. BECK M.D.

The patient has a pronounced deformity of the nose, which is said to have followed a blow. The internal examination of the nose is negative. The patient was under anti-luetic treatment for five months, without result. The skiagraph shows below the nasal bones four distinct nodules. The growth has developed rapidly in the past two weeks. A tentative diagnosis of sequestrum was made.

New Antral Chisels. By ARTHUR M. CORWIN, M.D. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)

COMBINED DISCUSSION.

DR. WILLIAM L. BALLENGER: The Heath operation referred to by Dr. Pierce is based on good principles, but what the result will be can only be shown by experience. Heath reports ten cases in which marked improvement in hearing occurred, and with closure of the drumhead in seven. Heath claims it to be a substitute for the radical mastoid operation. The principle of the operation is to avoid destroying hearing, in fact, to preserve it. Heath claims the results are equally good in cases of thirty years' standing, and in cases of thirty days' standing. I have operated five times by this method, but am not ready to report the results.

I wish to speak of some instruments that Heath devised for clearing out the middle ear cavity by blowing, both during and after the operation. The canulas are so shaped that they are readily introduced into the aditus and antrum. Air pressure is then applied and the secretions and debris blown out through the perforation in the ear drum. I have three sizes for each ear. They are introduced through the posterior meatal opening down to the annulus, and then turned forward into the aditus. Either air or fluid may be forced through the canula. In this way the secretions and debris are forced out through the perforation in the ear drum. Heath is of the opinion that the Eustachian tube is sufficient to drain secretions from the middle ear, but is inadequate to drain the middle ear, antrum and mastoid cells in combination. So he leaves a meatal opening in the posterior wall of the meatus through which he drains the mastoid cells, and the antrum, leaving the Eustachian tube to drain the middle ear.

Contrary to what Dr. Andrews recommended, Heath claims it is better to leave the ossicles alone, even when they are much destroyed, because by loosening them we disturb the fixation of the stapes in the oval window, and thus hearing is impaired.

Dr. Allport has devised some very ingenious instruments, and in doing my last Heath operation I discovered that his retractor is very useful to expose the drumhead to view, though the instrument is too heavy. So I have had an instrument made which is an adaptation of Todd's tendon tucker. It is very useful in this operation. It might also be used to expose the middle ear in a radical mastoid operation. I call it the meatal retractor, as it is used to spread the meatal flaps apart. As to Dr. Corwin's paper, I think that his instruments are good. A year ago Dr. Vail exhibited an instrument for the same purpose as Dr. Corwin's. His instrument consists of a saw made of a section of a tube. Dr. Vail was the first to introduce the same for making the lateral window. It is a splendid instrument. It cuts out an elliptical-shaped piece very quickly, and of sufficient size to thoroughly drain the antrum, and leaves a nice, smooth-cut surface.

DR. HENRY GRADLE: Dr. Stolte's description of the new operation for turbinectomy gives me an excuse to show an instrument which I devised for the partial removal of the inferior turbinal. It is a trephine working in a guard, which consists of a cylinder of brass, and from which one-half of the periphery is removed. I exhibited the instrument recently at a meeting of the Chicago Medical So-

ciety. It cuts smoothly and removes the exact amount of tissue desired. With it the operation requires but a few seconds of time.

DR. OTTO T. FREER: The first description in this society of the operation of the removal of the greater part of the nasal wall of the maxillary antrum for empyema was made by me in 1905, and my recommendation of this procedure met with much opposition at that time. It is a pleasure to note that this opposition has not only disappeared in this association but that in gatherings of an international nature, such as that of the British Medical Association at Toronto, the operation through the nasal wall has found such distinguished advocates as Dr. C. G. Coakley and Dr. G. L. Richards.

The method which I described in my first communication was that of the resection of the anterior two-thirds of the inferior turbinated body followed by the removal of the anterior two-thirds of the nasal wall of the antrum in the lower and middle meatuses by means of the straight trephine and bur driven by a strong, high-speed dental engine. I have practiced this method with the greatest satisfaction ever since my first description, and I am surprised that it has been so little adopted by others, and that it is thought necessary to seek for other implements, such as forceps and chisels, when the dental engine, bur and trephine have in my hands proven so peculiarly fitted for the work.

Curettement I have never found necessary, although all of my cases were chronic ones, for the suppuration from the antrum always ceased promptly as soon as the large opening for drainage and ventilation was established. The only implement in addition to the trephine and bur needed is a punch forceps to trim off portions of mucous membrane left after the bone has been cut away. A full description of my method may be found in the *Chicago Medical Record* for 1905, and *THE LARYNGOSCOPE* for the same year.

Walter A. Wells, in a recent most complete and admirable article on maxillary sinus suppuration, (*LARYNGOSCOPE*, Dec. 1906) objects to the trephine "as difficult to manipulate in the narrow nasal cavity, because held at an angle at which it must be, it tends to slide along the wall and thus injure the surrounding structures, or having penetrated the cavity, to strike upon the posterior wall and injure the internal maxillary artery or possibly the second division of the fifth nerve." Practical experience teaches me that these objections are merely theoretical. After the removal of the anterior two-thirds of the lower turbinal, the trephine may be most accurately applied,

with the aid of sight, to the nasal wall. I have not found that it has the least tendency to slip, as its teeth are held by mucous membrane. The fact that but slight pressure is required to make it penetrate, its advance being due to its high speed rotation, prevents any danger of its punching suddenly through and injuring the posterior wall, an accident much more likely to happen when the trocar or chisel are plunged through the nasal wall. It is possible, by forcing the cartilaginous nose well over, to apply the trephine at only a moderately acute angle to the nasal wall and to bring its cutting edge as far forward as need be.

So painlessly and easily does the trephine penetrate even a thick bony antral wall in the lower meatus that I now employ it for diagnosis instead of the trocar in this region. In several instances I have failed to pierce unusually thick bony walls in the inferior meatus even with a strong Krause trocar and the splintering penetration of this instrument, creating a fissured stellate fracture, always in my experience caused a great deal of pain. At present I pass as large a trephine as I can under the intact lower turbinate, bring its cutting edge well forward by pressing over the cartilaginous nose, and I have always found the patient surprised at the ease and painlessness with which his antrum has been entered. A Eustachian catheter is then passed in through the opening made and the antrum washed out, the fluid welling up from its lowest part and thus stirring up and forcing out of the natural opening all thick, cheesy pus that may have settled to the bottom of the cavity. The foul-smelling secretion is ejected in a thick stream in a manner that convinces doubting patients of the existence of empyema in their antra and makes them willing to undergo the operation of resection of the nasal wall.

Diagnostic washings through a trocar canula introduced into the antrum through the middle meatus I have not found satisfactory. The reason is that water introduced in this way into the upper part of the antrum of Highmore will not always mingle with the thick pus collected in its lower part, instead of this, flowing over it and coming out clear or nearly so from the natural opening, thus leaving the investigator in doubt as to the existence of empyema of the antrum or making him think the cavity free from pus when in reality viscid, clotted purulent matter lies in its bottom which will be ejected from the natural opening if the washing be done through an aperture made in the lower meatus. I recommend, therefore, diagnostic opening of the antrum of Highmore under

the intact lower turbinated body by means of the trephine driven by a dental engine. The latter should be of high speed and good power.

So far, I have had no difficulty in introducing the trephine underneath the elastic lower turbinated body which may be sprung upward out of the way. Should it prove impossible to lift it sufficiently I can see no material objection to passing through both turbinate and antral wall with the trephine.

The objection to the chisel, to my mind, is its tendency to shatter thin, brittle, bony partitions, such as the nasal wall of the antrum. I have also found that the use of chisels in the nose always causes a good deal of pain. I do not think that the light chisels Dr. Corwin has displayed would be efficient in cutting away the often massive and strong bony base of the nasal wall.

Considering how seldom curettement is necessary, I do not regard the preservation of the flap described by Dr. Corwin as of practical importance.

DR. JOSEPH C. BECK: Speaking of the Krause trocar, I wish to say that in the last six cases I have used the trocar with much satisfaction. In one case, that of a girl, eighteen years old, it was impossible to pass the trocar into the antrum, so that one is likely to encounter these thick bony walls in young persons and in women as well as in old persons and in men. I think that the trocar is one of the best instruments with which to enter the antrum above its floor. My method is to use the trocar previously to partial fracturing the inferior turbinal, not removing any portion of it, and then the Spiege forceps is passed into the antrum and any sized opening can be made with more ease and with less trauma to the patient than with any other method.

Dr. Pierce, in the case of facial paralysis, mentioned that the connection between the facial and hypoglossal nerve is naturally re-established. That is not true. Whenever the facial nerve is severed and more than one-sixteenth of an inch of nerve is removed, there is no bridging over, and complete paralysis cannot be prevented. A re-establishment of function is not to be expected. You must make an anastomosis. The result in Dr. Pierce's case is not due to a little twig of anastomosis, but is the result of an anastomosis between the facial and hypoglossal nerves.

As to the case he exhibited for diagnosis, I think possibly lack of time prevented Dr. Pierce from going into all the details of the case. I would ask whether the patient has received anti-luetic treatment,

whether any portion of the tissue has been examined, and whether the tuberculin test was made. I think that would help to clear up the case.

DR. HOLINGER: I would refer Dr. Beck to the reports of Dr. Bezold as to anastomosis of the facial nerve.

DR. OTTO J. STEIN: The cases shown by Drs. Pierce and Andrews appeal to me particularly because I saw Dr. Heath, of London, operate several times. I was struck with his method of operating. He did not use a self-retaining retractor. He made the post-auricular incision in the usual manner, and then separated the soft tissues from the bony canal and immediately began to chisel out the posterior superior canal wall. He soon reached the antrum and after curetting the aditus he blew out the secretions in the attic and middle ear. I was particularly struck with several omissions in his surgical technic and in his asepsis.

As to the results in his cases, they are about as he gives them in his recent paper. I cannot understand why he omits to explore the mastoid process in most of his cases. He apparently makes no attempt to do this, but goes into the antrum seemingly disregarding the possibility of a suppurating cavity further down toward the tip. Such a cavity must be present in many chronic cases, and any small sinuses that may be present cannot be detected unless we expose the parts more than Heath does. At the same time, he must assume that there is no necrosis in the tegmen tympani. He maintains that the "danger zone" is entirely in the antrum, and that there is scarcely ever any necrosis in the region of the tegmen tympani. But how can we tell unless we expose that region? This operation, although it has a place, is liable to prove a serious one when done by men who are not fully posted in the pathology of the ear. So that I would rather caution against too promiscuous operating by this method.

As far as the preservation of the hearing is concerned, that is a point that must be considered. I notice in Heath's report that in some of the cases there was marked destruction of the drumhead and necrosis of the ossicles. In such instances many of us would hesitate to operate after this method.

As to Yankauer's operation, I have raised the hypertrophied tissue from the lower turbinal by a somewhat similar method, although not so extensive. At that time I made just one incision from the posterior end of the turbinal, commencing at the juncture of the lower third with the upper two-thirds, and extending from the

posterior to the anterior end. I raised the soft tissues by making a large flap above and a smaller flap below. The excess of bone was then removed and the flaps trimmed and brought together, using a packing to keep in place. I had good results, even though I never attempted any suturing.

DR. L. J. HUGHES: The cases I wish to report illustrate the relation of eye symptoms to sinus disease. The first patient was a young lady, eighteen years of age, who had been under the observation of a general practitioner for several years for frontal headaches, which sometimes extended to the occipital region. They were more or less constant. We referred the headaches to the eyes, and on examining these, we found marked hypermetropic astigmatism, three and a half cylinder, with $1/25$ sphere. She had a correction under atropine, and the symptoms were partially relieved for a while. She also had quite an esophoria, 18 or 20 degrees. Under all the treatment we could give her, both local and general, there was very little improvement, so that we looked elsewhere for the trouble.

An examination of the nose revealed slightly enlarged turbinals and, while the patient was under observation, there developed a fairly large polyp from the middle turbinal. This was excised by Dr. Beck, and her symptoms were slightly relieved. Later on the middle turbinal became enlarged and pressed against the lateral wall of the septum. It was removed, and almost immediately all the symptoms disappeared and up to the present time the patient has had relief.

The second patient came under observation last Thursday. The man complained of severe frontal and temporal headaches. He had had some stomach trouble and to this he attributed his headaches. I found that he had a blepharospasm of each eye. Visual acuity was $20/30$, and otherwise the eye was normal. Under atropine vision was found to be practically normal. He had 20 degrees of esophoria, but no marked deviation. The first thing we saw on Saturday morning was a paralysis of the external rectus muscle, and suspecting a specific origin, he was put on mixed treatment. The following morning (Sunday) he was found dead in bed. At the inquest, it was shown that last October he was held up and severely battered by footpads. At that time there were marked contusions about the eye and the ear. There was also a history of influenza. The dura was found adherent, and there was a marked hemorrhage all over the brain. The immediate cause of death is open to question.

DR. PIERCE (closing the discussion on his part): The operation which some of our members have referred to as the Heath operation has, to my certain knowledge, been in service for a good many years. It is perfectly absurd to tack on to a surgical procedure the name of the last man who has written about it. I believe it has a very limited field of usefulness, but that field cannot be ignored.

As to the last case that I reported, I want to call attention to the fact that when I first saw the patient there was no granulation tissue, the bottom of the ulcer consisting of the bone. There was a slough around the margins of the ulcer, and this was composed of this whitish material, mixed with dark-colored tissue, entirely necrotic. The patient had had anti-specific treatment, without any result. I think the case will bear watching, not making any attempt to interfere. I believe it is due in some way to the hysterical condition. Some instances have been observed, and therefore I am going to wait and see the outcome of the case. It is changed absolutely in the week that I have had the patient under observation. The ulcer is closing up. Her unconscious spells have entirely disappeared, except the one she had when I examined her for the stigmata which, as I have said, were so typical.

DR. ANDREWS (closing the discussion of his part): I think that the operation in which radical work is done, with the exception of removing the ossicles, has a place, although the field is not a very extensive one. If we can operate and retain the patient's hearing, we ought to hesitate a long while before we undertake to remove the ossicles.

It has been asked what means we adopt to know just exactly what is being done deep down in the operation cavity. I think if we will use a Koerner flap, and make the incisions before completing the bone work we will have no trouble in easily seeing into the depths of the operation cavity.

DR. CORWIN (closing the discussion): The chief point I wish to make in speaking of the operation which is really the Claoué, a modification of the Rethi, is the preservation of the flap. That can be trimmed to any proportions and put through the window to cover with epithelium its lower margin. That is the essential feature of the operation. Saws and trephines and burs and forceps can be utilized in making the opening, but it struck me that the chisel is very useful in many cases. In using it there is no danger of injuring the flap which one has taken the trouble to save.

SELECTED ABSTRACTS.

The Treatment of Diseases of the Accessory Sinuses. M. A.

GOLDSTEIN (St. Louis) *St. Louis Med. Rev.*, May 12, 1906.

In this paper, part of a symposium, Goldstein differentiates "the symptomun complex demanding radical surgical intervention, from the cases which can be satisfactorily disposed of without radical measures." He therefore epitomizes and groups the suppurative processes in each of the accessory sinuses.

In acute empyema of the *maxillary sinus* when it is simply a question of draining the accumulated pus, he thinks the trephining of the alveolar process and flushing of the antrum with antiseptic solutions will often effect a cure, and that the patient should be given the benefit of this conservative treatment. Equally simple is an exploratory puncture through the nasal wall, and subsequent flushing of the *antrum*.

If these two simple methods are insufficient to check the condition, the thin nasal wall of the antrum should be resected, and probes, canulas, curettes, etc., can then be used. The procedure involves the preliminary removal of the anterior two-thirds of the inferior turbinate.

This constitutes, in Goldstein's mind "the limitations of conservative surgery of this sinus. Radical surgery is indicated when there is either necrosis, or new growths, and when there is a constitutional dyscrasia.

As the *ethmoid cells* are more frequently (over 70 per cent.) involved as suppurative foci than any others, it is fortunate that they are so accessible. In all cases of simple acute ethmoiditis, Goldstein would simply effect drainage by means of cocaine, adrenalin, hot antiseptic douches if necessary, and astringent applications. If such measures fail, the more radical measures should follow.

As to the *frontal sinuses*, the results of those who have had the greatest experience, show that in over 80 per cent. of the cases of acute frontal sinusitis, complete recovery has ensued after intra-nasal treatment, including removal of the middle turbinate. Goldstein quotes Coakley as to the symptoms demanding external opening of the frontal sinus. Goldstein holds that in chronic suppurations, while there is less opportunity to secure effective results by the intra-nasal route, "even here, all conservative measures should be given a fair trial before resorting to radical surgery."

EATON.

Clinical Studies in Disturbances of Hearing. Part 3. The Hearing-curve in Cases of Insipated Cerumen—PAUL OSTMANN—*Arch. f. Ohrenh.*, Leipzig, July, 1904.

The amplitude of the vibrations of a tuning fork decrease continuously from the moment it is struck until it ceases altogether. This decrease follows a curve which varies for forks of the same pitch according to their construction, and must be determined separately for each individual fork. When the amplitude of the vibrations reaches a certain minimum size, the fork ceases to be heard by the normal ear. Ostmann measures the defective ear by noting the number of seconds which elapse between the moment when the fork ceases to be heard by the defective ear and the moment when it ceases to be heard by the normal ear. Having determined the "diminution curve" for his fork, and knowing that the intensity of a sound is proportionate to the square of the amplitude of its vibrations, he is able to calculate from these data, the minimum intensity perceived by the defective ear. For convenience in the calculations as well as in the construction of curves, logarithms were used instead of actual values.

The minimum amplitude heard by the normal ear varies for forks of different pitch, and is smaller for high notes than for low notes. The work performed by a tuning fork to make the sound perceptible by the normal ear is less for high pitched forks than for low pitched forks. That is to say, the normal ear is much more sensitive to high notes than to low ones. Having determined the minimum amplitudes for a series of forks. Ostmann constructed a "normal curve," in which the abscissas are the number of vibration of the forks, and the ordinates the logarithms of the square of the minimum amplitudes (in millimeters) perceived by the normal ear. Based upon this "curve of logarithmic intensity," he constructed a curve for the diseased ear, having selected the simplest form of deafness, that due to inspissated cerumen.

From 16 cases he deducts the following conclusions:

1. That the curve in cases of cerumen is a characteristic one.
2. The curve shows a diminution in sensitiveness for all notes between C and c4 and the decrease is greater for the higher notes.
3. In spite of the fact that the sensitiveness for high notes is diminished more than for low notes, nevertheless the sensitiveness of the human ear for high notes is so much greater than for low notes that the remaining hearing power for these high notes remains better than for low notes. This explains the fact that previous clinical methods did not lead to erroneous conclusions.

Curves constructed from cases of deafness due to other causes showed entirely different characteristics.

YANKAUER.

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ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding
that they are contributed exclusively to THE LARYNGOSCOPE.)

CAUTERIZATION OF THE FOUR SUSCEPTIBLE AREAS OF THE NASAL MUCOSA.*

BY PROFESSOR GUSTAV KILLIAN, FREIBURG-IN-BR.

Recent endeavors to reconstruct the methods of treatment of hay-fever along thoroughly scientific principles have been more successful in theory than in practice. I did not concern myself much with the Dunbar theory, but was especially interested in developing my own clinical data gathered for many years, and thereby happened upon a therapy which produces temporary relief, and for which patients are grateful. This therapy is not only of service in hay-fever, but also in the various forms of reflex neurosis, known to us collectively as a vasomotor rhinitis, a class to which bronchial asthma may also be added.

My basis for procedure is as follows: The mucous membrane of the nose, like all other mucous membranes, may become hyperaesthetic. Such hyperaesthesia may exist without definite manifestation of inflammation. This may easily be detected with the probe, a very convincing yet somewhat crude method of examination; for the hyperaesthesia manifests itself sufficiently in cases where even a much milder irritant, such as dust, causes tickling and a tendency to sneeze. The presence of a hyper-sensitive mucosa may be definitely determined by delicate probing, and by similar probing of the normal mucosa valuable comparative data can easily be gathered.

The hyper-sensitiveness of the nasal mucosa is produced in vasomotor rhinitis by prolonged irritation, sometimes of the mildest form, brought about by changing conditions in the seasons of the

* Presented at the Twenty-ninth Annual Congress of the American Laryngological Association, Washington, D.C., May 7, 1907.

year, habits and occupation. In most of these cases, the irritation is a mechanical one, due to fine dust particles, or to various pollen which have an additional chemical reaction. A patient may be exposed constantly, or daily at definite periods, to the harmful effect of dust, or, not until he is exposed to the dust upon the street. This irritation produces a varying degree of discomfort in different patients. There are predisposing general and local conditions, where a narrowed lumen of the nares with impaired nasal respiration, and catarrhal conditions, or greater sensitiveness of the mucosa and more pronounced irritability of the nervous system exist, where acquired or hereditary causes must be considered.

It is evident that dust particles which act purely mechanically provoke only slight irritation. Repeated irritations of this character must eventually produce a hyper-sensitiveness. This condition will develop more rapidly when toxins are liberated by the dissolving of these particles, to which the mucosa is especially sensitive. It may happen, however, that such irritating substances are present in gaseous form in the air taken during respiration, so that it is not a mechanical but a distinctly chemical irritation with which we have to deal. It is remarkable that some gaseous substances, as the perfumes of flowers, for example, are irritating to some and not to others. My only explanation for this is that a hyperaesthesia of the nasal mucosa, especially of the olfactory region, has been previously developed. In my further investigation I shall eliminate such cases in which gaseous substances are etiological factors. They belong to a special class because in these the irritation extends over the entire nasal mucosa and even to the mucous membrane of deeper areas of the respiratory tract. It cannot be denied that those areas on which the impurities of the air are first impinged are most infected, even though the influence of pollen is locally and specially active in the olfactory region.

Let us consider only the harmful effects of dust particles. If this effect takes place at all, it must act most violently at the first point of contact and where it is deposited in largest quantities, and distinctly located in the anterior cavities of the nose. Where opportunity affords an examination of a patient who has just worked in dust or soot, we find large deposits anteriorly on the septum, and on the anterior ends of the inferior and middle turbinals. This has been definitely verified experimentally.

The air taken during respiration does not pass directly backwards through the nose in a straight horizontal line, but follows a curve up-

wards, as the current of air passes over the curved floor of the nose in an upward direction. The air is cleansed of its dust particles mainly in the anterior nares. The ciliary activity and increased mucous secretion cannot remove these dust particles with sufficient rapidity to overcome this intense irritation. In this way inflammation may be produced and the tendency to hyperaesthesia increased, especially when these particles act not only mechanically, but also chemically.

The irritation of the deeper nasal mucosa can scarcely be compared with that to which the anterior area of the nose is subjected. To the more intense effect of dust must be added the direct sensation of an irritation in the anterior nares. This is experienced most acutely by patients in whom a hyper-sensitiveness already exists, and in which the effect locally is emphasized. The patient feels distinctly the above mentioned points—that is, the anterior portion of the septum and the anterior end of the lower turbinate; but I am not able to speak with certainty of the middle turbinate. The feeling of discomfort after an intense irritation may increase to a strong tickling sensation, and this is not diffuse, but distinctly localized in two spots, one being lateral, the other medial.

The lateral lies slightly above the region of the anterior end of the middle turbinate; the medial is felt on the upper part of the septum about the tubercle. By probing one can easily prove that just these two spots exhibit the greatest sensitiveness, showing at the same time a most varying degree of sensitiveness and difference in the sensibility of these two localized spots. Sometimes the two points on the one side are more sensitive than on the other; again the medial is more sensitive than the lateral, or vice versa. My experience has been acquired through numerous observations of these conditions.

Patients designate these spots with the greatest precision and call the physician's attention to them; but I am able to speak from personal experience because I have often suffered from vasomotor rhinitis and mild hay-fever. At such times, it was only necessary to pull apart a fragment of cotton. The fine particles of dust caused thereby immediately brought on an attack, which proved how small a mechanical irritation need be to affect a sensitive mucous membrane.

I cannot forego the remark that these sensitive spots are located in the region of the ethmoidal nerve, which supplies the anterior nasal cavities with a medial and lateral branch. This form of hyper-

aesthesia, therefore, is dependent exclusively on an irritation of this branch of the trigeminal nerve.

Hyperaesthesia of the nerve ends of the mucous membrane results in an accentuation of the normal reflexes, tickling and tendency to sneeze and increased secretion, because of the extension of the irritation. The reflex action upon the secretions need not be localized. A slight irritation with the probe in the anterior nares will often produce a localized hyper-secretion, at many points on the mucosa mucous globules appear. Most often, however, this hyper-secretion is diffused along the entire mucosa. This symptom-complex does not depend upon the amount of irritation, but rather on the degree of hyperaesthesia. The slightest irritation can sometimes produce in a highly sensitive mucosa an enormous hyper-secretion, so that the secretion flows copiously from the nose. We deal in this case with a reflex condition of local origin. In cause and effect it is limited to the region of the nose. As it is the ethmoidal nerve which is affected, the reflex curve is in the direction of the first branch of the trigeminus and extends through the medulla oblongata.

The characteristic condition resulting from the oft repeated process of such reflex action we call reflex neurosis. In all so-called cases of vasomotor rhinitis and hay-fever we deal with a local reflex action which occurs most frequently when there is much dust, and which is sometimes prolonged into the colder seasons, where special conditions must be considered.

The irritation originating in the ethmoidal nerve can extend to other nerve areas. Sneezing is an example of this. Here the entire breathing mechanism and above all the vagus nerve is brought into play. In case of vasomotor rhinitis, too, and especially in the milder forms of hay-fever, all possible modifications must be considered. The irritation extends to other branches of the trigeminus, chiefly to those of the eyes, and to the vagus. The question then resolves itself into one of reflex neurosis of nasal origin, and of reflexes widely disseminated from this area.

It seems remarkable that the irritation extending to the vagus should result in a typical manifestation familiar to us as asthma. The relation of bronchial asthma to the nasal cavities, especially in the vasomotor forms of rhinitis, are established beyond doubt by numerous observations. The most convincing proofs are to be found in hay-fever patients suffering from asthma where the attacks vary from the lightest to the severest form.

In other cases of asthma, the local nasal conditions diminish until they are scarcely noticed by the patient. The hyperaesthesia of the nasal mucous membrane and especially of sensitive spots brings us to a proper understanding of the subject. I have observed that in tickling these spots with a probe an attack of asthma or asthmatic symptoms could be produced. I must avoid becoming interested in the confused theme of bronchial asthma, and would emphasize—only to avoid misunderstandings—that asthma and asthmatic conditions may be induced from reflexes other than those of the nose. I wish to consider here only asthma of nasal origin that I, generally speaking, class as a quintus vagus neurosis. Here also the reflex arch may be continued through the medulla oblongata, and it should be emphasized that in these cases a psychic influence is more frequently possible than in localized nasal reflex neurosis.

And now to the treatment of these conditions, which must be a twofold one.

(1) Local treatment: Removal of causes which excite hyperaesthesia of the mucous membrane and elimination of reflexes as well as of predisposing causes within the nose.

(2) General treatment: When the nervous system is to be considered. This we can sometimes accomplish, but incompletely. Dust and similar substances can be avoided to a certain extent, but we can bring about best results through mechanical interference in the internal nose, in conditions of deflected and thickened septum, chronic rhinitis with swelling and hypertrophy of the turbinates, nasal polypi, and accessory sinus affections.

Aside from all this, we must employ a rational therapy to allay a hyperaesthesia of the nasal mucous membrane. Above all else, it is imperative that the above mentioned reflex curve be attacked at an easily accessible point. This is most easily accomplished at the very beginning—that is, on the surface of the hyper-sensitive mucosa, and will be most effective if we accurately reach the above-mentioned irritable points.

This method has been employed before, but was imperfect because the process was only a partial one, and areas were included where no therapy was needed. Thus for a long time the inferior turbinate was cauterized along its entire surface. Spiess called attention to the tubercle of the septum and cauterized it. I was soon convinced that it was necessary to cauterize all points of irritation at one sitting. The cauterization must be carried out on both the medial and lateral points, that is, at four points, and it is best done

with trichloroacetic acid, which is applied on these spots after preliminary cocaineization.

As this reagent diffuses itself very rapidly, it should be applied with a small cotton-tipped applicator, and care used to keep it circumscribed. On each of these four areas a cauterized surface of less than one-half inch diameter suffices.

With such limitation, the results, even when all four points are cauterized at once, are comparatively slight. The patient is directed to remain quiet from one to two days, and in a few days the surfaces are healed.

In the majority of cases results are at once noticeable, while in other cases improvement is delayed until the eschar after cauterization has disappeared.

My experience in a large number of cases has convinced me of the palliative effect in some, and even complete cure in others. The result is seldom permanent, and is only of temporary value, being effective for a period of several weeks. That, however, can extend over an entire hay-fever season. There is no contra-indication to recauterization. By means of this therapy, stubborn cases are often made to yield. This method should not be considered a universal cure, especially not in cases of many years' standing, but it should be given a trial even in such cases.

I feel justified in recommending this technique. In the hands of the skillful and careful rhinologist, this procedure in conjunction with other indicated intranasal medication, will prove of much value to the patient.

39 Friedrichstr.

CHRONIC SUPPURATION OF THE FRONTAL SINUS.

BY H. P. MOSHER, M. D., BOSTON, MASS.

The past two years have added a number of new facts which bear upon chronic suppuration of the frontal sinus and the methods which are employed for its treatment. About certain of these I wish to speak. The use of the X-ray has become a routine procedure for giving the size and the location of the sinus. It is the only means of determining whether the sinus remains in the orbit as an anterior ethmoid cell or whether it has developed normally and risen out of the orbit into the brow. It tells the operator how far above the root of the nasal bone he can safely enter the sinus, and; therefore, how large a bridge of bone he can leave above the inner angle of the orbit. It is essential to know this, because experience has shown that if no bridge is left excessive deformity results. Those operators who prefer to enlarge the duct of the sinus with a burr passed upward through the nose must find the lateral X-ray plate their chief reliance, because in no other way can they determine the extent of the basal relationship between the floor of the sinus and the ethmoid region.

Clinical experience has shown that in the majority of cases where there is pus in the frontal sinus a good X-ray plate will indicate it. For this reason the X-ray has become of great diagnostic value. It should be remembered that in acute inflammation of the sinus the infiltrated mucous membrane will give a shadow on the plate. If one wishes, the progress of the inflammation can be watched by taking successive plates. Without a history which indicates it the presence of a shadow in a suspected sinus does not mean chronic inflammation. Even where chronic inflammation of the sinus does exist, if the pus has been discharged into the nose or into the orbit there may be no shadow on the plate. This explains why in some cases of marked exophthalmos or ethmoid tumor the plate findings are not positive. By not bearing this point in mind, operators have been disappointed with their plates. I found on washing out the antrum and then using suction by means of the vacuum apparatus that the plate taken after this had been done made the diseased antrum look like a normal antrum, even more normal than the undiseased one. The vacuum apparatus might have the same effect upon the mucous membrane of the frontal sinus.

The vacuum apparatus is a valuable method of bringing pus from the frontal sinus into the nose for diagnostic purposes. At once

one thinks of using it in attacks of acute inflammation in order to open up the duct and drain the sinus. The apparatus which I have used is so powerful I have felt that it might increase the hyperæmia in the sinus and so perhaps add to the severity of the inflammation. Further experiment is needed in order to settle the safety and the efficiency of this method.

The question as to the operation of choice in chronic suppuration of the frontal sinus is still an unsettled one. There are three prominent methods in use. We are gradually coming to conclusions as to their relative efficiency. Where there is a large basal relationship between the floor of the sinus and the ethmoid region of the nose, if the patient is willing to take the large chances of failure, the operator may open the front wall of the sinus far enough above the orbital rim to leave a bridge and then make as large an opening from the sinus into the nose as is anatomically possible. This procedure will occasionally result in a cure. In my experience it has failed so much oftener than it has succeeded that the patient must elect this method; I will not advise it.

The method of obliterating the sinus by granulations is very alluring in theory. One-half of the cases which I have done by this method I have had to do over again. I have not had the good fortune to obliterate the sinus in the short time given by some operators. The method is tedious for both patient and operator. The deformity resulting from it is very marked in a large sinus and considerable in a small one. The injection of paraffin will diminish the deformity or do away with it entirely. Paraffin must not be used until it can be placed in sterile connective tissue. If it reaches any ungranulated pocket or projects into the nasal cavity it will act as a foreign body and slough out. I have proved this to my discomfort by filling two frontal sinuses with paraffin after the cavities of the sinuses had become covered with a good coating of granulations. The skin incision readily closed over the paraffin. In both cases, however, a part of the incision opened again later and paraffin was discharged in small pieces partly through a persistent fistula and partly through the nose.

The great aim of all operators is to cure the suppuration and leave no deformity. My experience with sixteen Killian operations is that this procedure will accomplish these two things better than any other. I am positive as to its great merits in causing little or no deformity. Last June at Toronto, I showed a series of casts illustrating this point. Further observation of these cases and observations on cases operated since have convinced me that a sinus of

moderate size operated by the modified Killian operation will have no deformity and that very large sinuses can be operated by the same method and still there will be no deformity. Of these sixteen cases, one-half are cured of their suppuration, four have had the discharge markedly lessened, and four cases have not. One case has required a second operation. All the cases have been freed from pain.

The technique of the Killian operation. I wish to mention a few points in connection with this. In making the opening through the ascending process of the superior maxilla the Krause burr has given me the greatest satisfaction. By using it there is no danger of splintering the nasal bone. It is often useful to delay making the incision through the mucous membrane of the nose until the internal angular process of the frontal has been sufficiently removed to make a large opening into the frontal sinus from below. There is comparatively little bleeding until the nasal mucous membrane is incised. Killian's method of doing away with the posterior nasal plug by packing the choana by narrow cotton tampons passed through the nose is of very great service. In operating in the recumbent position, if strips of gauze are used instead of the cotton tampons, this method of packing may leak a little, so that I reinforce it by a small nasal plug. The great advantage of packing the nasal cavity up to the middle turbinate, as is done in this method, is that one-half of the nasal cavity is obliterated, so that the pool of blood in which the operator has to work is reduced to one-half its depth. Owing to this it becomes possible for the operator to see his way about in the ethmoid labyrinth. Without this packing there is so much blood that the operator has to work by feeling and his knowledge of distances.

In operating upon the ethmoidal cells by the route through the ascending process of the superior maxilla and the lachrymal bone, the operator is working above and to the outside of the middle turbinate. I have repeatedly been annoyed to find how much of the middle turbinate remained after the Killian operation. Often it is half detached and pushed downward a little but not removed. It is better, therefore, if the patient will allow it, to remove the middle turbinate under cocaine as a preliminary procedure, or to sit the patient up and remove it as the first step in the ether operation. In my last operation, I found Hajek's hook very serviceable in detaching the middle turbinate from the superior turbinate. The use of the hook through the opening in the lachrymal bone is especially satisfactory because you can see the olfactory fissure and can pass the

hook directly back in it to the front wall of the sphenoidal sinus. All the time you are working parallel with the cribriform plate instead of at an angle with it, as you have to do if the hook is used through the nose from below upward. The hook will break up the ethmoid cells nicely so that there is but little left for the curette to do. If the middle turbinate is not thoroughly removed it may turn outward like a flapper and glue itself to the os planum and prevent the frontal sinus from draining. If any of the middle turbinate is left its stump must be attacked immediately after the main operation otherwise the middle meatus will fill with secretions and as a consequence the frontal sinus will do the same. If this happens, the sinus fills with pus and the incision in the brow bursts open. In most cases such a happening ruins the operation. Great vigilance in the after care of the middle meatus is the price which it is necessary to pay for a surgical operation.

The turning of the lachrymal sac from its bed requires care, and should not be hurried. If the sac is so bruised that chronic suppuration is set up within it the operation results in a calamity. I have been in constant fear of infecting the sac. In but one case, however, have I had any trouble, and this was only temporary. After the operation, it is well to pack the sac into place by placing a tent of gauze in the inner angle of the orbit. I make it a routine to wash the eye out daily with warm boracic acid solution. The lids can be kept from gluing together by a mild corrosive ointment. If the sac becomes infected probing should be resorted to with the greatest care, if resorted to at all, because the sac has lost its bony bed so that the probe lacks the firm groove which it usually has to guide it.

It should be possible to open the frontal sinus for exploratory purposes without infecting it. Believing this I explored two sinuses which proved to be normal and promptly infected them. I think the chief reason for this is the following: The skin incision was entirely closed and the sinus filled with blood. This is once coagulated into a jelly like cast of the sinus. The blood, therefore, did not drain into the nose and the clot became infected either from the nose or from the skin incision. In order to avoid this post-operative clot I now fill the sinus with gauze for a day or two, then remove it and tie the provisional sutures left for that purpose. In the Killian operation, it is just as important to prevent this clot as it is when a normal sinus is opened.

The pulley of the superior oblique muscle is the only anatomical obstacle to the removal of the whole floor of the frontal sinus. A

sufficient disturbance of the pulley gives double vision. Probably we have been a little too much afraid of the pulley. A recent operative case bears this out. A woman came to the eye clinic with her right eye pushed downward and outward. There was a history of a discharge of pus and blood from the nose some months previously. At the time that she came to the hospital there was nothing to be seen in the nose. The operation showed that the cavity of the sinus and the upper part of the orbit was filled with a brown jelly like mass. This proved to be sterile and was composed of fibrin and disintegrated blood corpuscles. The whole floor of the sinus had been eaten away and the anterior wall was in process of absorption for the curette perforated it in stripping back the periosteum. Since the whole floor of the sinus had disappeared the pulley of the superior oblique had lost its bony attachment. I was curious to see if the patient would have double vision after the effects of the operation had worn away. Today, four weeks after the operation, there is a little fullness over the inner canthus because the tissues have nothing to which they can attach themselves, yet there is no double vision and never has been any. Therefore, we can allow ourselves more freedom in working about the pulley of the superior oblique than we have allowed ourselves in the past.

The orbital prolongation of the frontal sinus is a great obstacle to the obliteration of the sinus by granulations. If, however, the operator uses Killian's method a large orbital prolongation is not a hindrance but a help. The larger the orbital prolongation the larger the basal relationship between the floor of the sinus and the ethmoid region. By following the os planum upward until it merges with the floor of the orbital prolongation and then working outward over the orbit and backward over the orbit as much as the orbital prolongation will allow, such a large opening can be made into the nose that granulations cannot readily close it.

Knowing that the antrum acts as a reservoir for the frontal sinus in chronic suppuration of the sinus, and relying upon the ability of the mucous membrane of the antrum to recover its normal condition by the radical procedure in a few of my cases. Most of these cases, however, finally had to have the antrum opened. The mucous membrane of the antrum had become so thoroughly infected that it had lost its power of recovery. In the future, I shall treat the antrum radically at the time that I treat the frontal sinus and the ethmoid cells.

I have done three double Killian operations, operating upon both sinuses at the same sitting. There is no more shock than when one

sinus is done. It has always surprised me to see how little shock this operation causes. In one of the double Killian cases there was falling of the bridge of the nose at the point where the patient's spectacles rested. In but one case of my sixteen has there been any pitting of the scar along the side of the nose. I have been much pleased to find how the skin scar on the nose fades out. If there has been first intention, after a year the skin scar is barely noticeable. Most of my patients have been women, and some of them young ones, but they have all been pleased with their scars.

Any packing which is put into the sinus or into the nose should be wrapped with Cargile membrane. When this is done the packing slips out without causing bleeding and with very little pain. I cannot recommend too strongly the use of this membrane as a covering for all packing in the nose which is to come against abraided surfaces.

Last year I made the statement that tuberculosis would be found to play a part in causing chronic suppuration of the frontal sinus. Tuberculosis is primarily a disease of the respiratory tract. The accessory sinuses are parts of the respiratory tract and should share in the most common disease of this tract. From the construction of the sinuses, one would expect in them a low grade tuberculosis rather than the active form found in the soft tissues of the lungs. Recently some experimental and clinical work has been carried out which is of interest in this connection. For a long time, eye specialists have had to deal with a low type of scleritis which has baffled both treatment and all attempts to find its cause. This condition has of late been proved to be a low grade tuberculosis. The diagnosis is made by injecting tuberculin. The idea has been suggested that perhaps some of the sclerosing affections of the ear are due to the same cause. Mucous membranes are not given to sclerotic processes but to degeneration with the formation of pus and polypi. It is a suggestive thought that perhaps a low grade tuberculosis of the accessory sinuses may be responsible for a percentage of the cases of chronic suppuration. On this theory, I have tested two cases of chronic suppuration of the frontal sinus, one with ethmoid tumor and one with exophthalmos, but the tuberculin gave no reaction. One of my colleagues was more fortunate. In his case, a girl of fifteen with a discharging fistula over the inner canthus of the right eye, with pus in the nose, with moderate exophthalmos, that it was to all appearances a typical case of disease of the frontal sinus and the ethmoid labyrinth, the injection of tuberculin gave a positive reaction.

In these newly solved cases of scleritis the injection of tuberculin is used first to make the diagnosis and then to effect a cure. In an ethmoiditis or in chronic suppuration of the frontal sinus due to tuberculosis, operative measures may therefore find a great ally in tuberculin. The serum might in such cases do more than the knife. Another recent development in serum therapeutics makes this idea seem less visionary. It is maintained that the opsonins are to rival surgery in the treatment of chronic suppurations. Remove acute symptoms by providing adequate drainage and the opsonins will do the rest is a proposition which the laboratory men are trying to substantiate. At the present time I have one rebellious operated case of chronic suppuration of the frontal sinus under this form of treatment. It is, however, too soon to report results.

As time goes on I cannot bring myself to a belief in the safety and the efficiency of the various methods of treating chronic suppuration of the frontal sinus through the nose. Tubes can be passed into the sinus from below and retained there. I cannot see, however, why the tube does not act in the frontal sinus the same as it does when placed in the antrum through an opening in the alveolus. It acts as a foreign body in one case; it should do the same in the other. If there is a sufficient basal relationship between the floor of the frontal sinus and the nose, a burr can be pushed up through the duct into the sinus, the burr running on a probe as a pilot. The unguided burr is also used. On the cadaver beautiful specimens can be made in this way. What I am afraid of is that these methods will make cadavers of some of my patients. These methods leave out of account the diseased mucous membrane of the sinus and the pockets made within them by septa. If certain operators have so far found the burr method safe that is to be recorded in favor of the procedure. It surely does not look safe. To my mind it is more surgical to open the sinus and see the problem that you have to deal with. The reason why these methods attract is that they leave no deformity. We know, however, that the modified Killian operation also will leave no deformity, and we know that this operation will cure. Operating in the frontal sinus and in the ethmoid region is blind work even when we attack these regions by the most direct routes and with sufficient openings. By preferring the Killian operation, the operator minimizes as much as possible this working in the dark. When the operator cannot see providence must guide the knife.

THE RAPID ENTRANCE OF THE MAXILLARY ANTRUM THROUGH THE INFERIOR MEATUS WITHOUT GENERAL ANESTHESIA.*

BY H. HOLBROOK CURTIS, M. D., NEW YORK.

It is my purpose to illustrate a rapid method of opening the maxillary antrum from within the nose, rather than to discuss the subject of antrum empyemas, which prompts me to take part in this symposium.

In frontal sinusitis I have insisted that the practice of treatment from within, by removal of the anterior tip of the middle turbinate, breaking down the ethmoid cells in order to permit the entrance of a frontal sinus catheter to the frontonasal duct and constant douching of the cavity, should in almost every case precede the external operation.†

In antral empyemas, a similar expedient should be attempted before deciding upon a radical canine fossa operation. In acute cases, the cure is generally spontaneous, the purulent discharge ceasing when the cold or grip gets well. If this does not occur, but the empyema remains with pain as a symptom, relief may be expedited by daily washing out the antrum by means of a canula passed through the natural orifice, or, a slight enlargement of the same. In chronic cases, we must remove as much of the inferior turbinate body as will permit the making of a fenestration in the interior wall large enough to enable the operator to curette the antral cavity and pack it with iodoform wool. It is my custom to make the opening of such size as will permit the little finger to enter the antrum and do the exploring and, if necessary, the packing. This procedure, thanks to a small digit, I have found very convenient in cases of profuse hemorrhage. There is no absolute rule to follow regarding the dimensions of the fenestration, as the anatomical peculiarities determine the question. In general terms, the larger the better. I have never regretted a large opening. The great advantage of this method of operating is, that the employment of an anaesthetic is not necessary except in very nervous subjects.

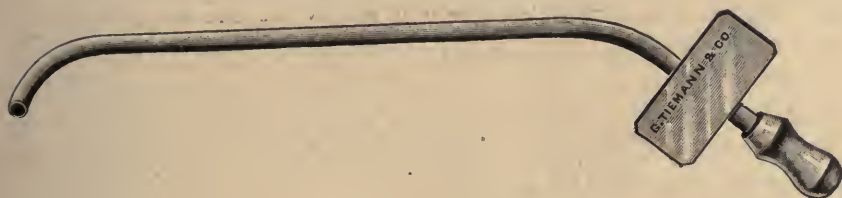
The plan of procedure is as follows:

* Read before the New York Academy of Medicine, Section on Laryngology and Rhinology, March 27, 1907.

† *Ann. of Otol., Rhin. and Lar.*, Dec. 1906.

For fifteen minutes a pledget of cotton saturated with 10% cocaine hydrochlorate solution and an equal part of adrenalin chlorid solution 1-3000., is introduced between the inferior turbinate and the antral wall; a smaller pledget is laid over the antral wall in the middle meatus covering the lower turbinate over its line of insertion.

Next, with the turbinectomy scissors the inferior turbinate is incised for about one inch, as near its insertion as possible, and the piece removed with a coarse snare. There is generally no bleeding to prevent the immediate continuance of the operation. If I have not already done so before the removal of the turbinate, I now inject by means of a canula and syringe, a small amount of adrenalin solution with, say 2% cocaine into the antrum, if possible through the natural orifice, or through a small perforation made by a trephine in the inferior meatus wall.



By the time the field is free from blood and the remaining part of the cut turbinate trimmed smoothly with Gruenwald's forceps, the adrenalin and cocaine have rendered the lining membrane of the antrum non-sensitive and anemic.



The next step is the fenestration, which is done with an electric trephine, Volkman's spoons and forceps, or better with a gouge which I have lately devised and found to be a very efficacious instrument, for frequently we encounter very thick and obstinate walls, to break down which requires quite a little force. The gouge which I exhibit is constructed with such a curve that it naturally adapts itself to the preferable point of entrance, viz., as far anterior as possible, and the edges are so ground on the convexity that after the entrance of the instrument we may cut backwards by holding the shaft steadily as we use the mallet.

This instrument takes a tongue out of the wall a quarter of an inch vertically by whatever depth you desire. This tongue in removal, is pressed into the inferior meatus by the gouge, and is clipped off by appropriate forceps. The fenestration is then made oval in shape by means of the burr drill, cutting spoons or sickle knives, care being taken to make the lower edge as near the level of the antral and nasal cavity as possible. By the use of appropriate stiff curettes bent at various angles, the cavity may be very satisfactorily cleansed of the major pathogenic impedimenta, and we are enabled to ascertain whether the inferior border is free from dental complications. If eroded bony areas are found with penetrating roots, the teeth must be removed, and this alone will in many cases prevent the necessity of a more radical operation. After a rapid curetting of the cavity I pack it with iodoform wool and allow it to remain for three days. The end of the wool should be brought out of the nostril and secured, or else it is apt to get into the pharynx and produce tickling. In this way, I have three times cured cases of antrum trouble which have been previously operated on by the canine fossa route. Unlike the mouth, the nasal cavity after operation does not seem to act as a source of reinfection of the accessory sinuses, any more than the purulent secretions of the nose infect the septal operation and the turbinectomies we are constantly performing. I may safely say that this operation has in my practice replaced the canine fossa operation in nine out of ten cases in which I had previously considered the more radical operation to be necessary. With much larger experience, I see no reason to alter my views expressed in a paper read before the Laryngological, Rhinological and Otological Society in 1903 and published in *THE LARYNGOSCOPE* of October of that year. I exhibit the gouge for making the inferior opening as well as a perforator employed for enlargement of the natural orifice, together with trephines, drills, burrs, spoons, sickle knives, curettes, etc., useful in completing the fenestration. The further steps in the treatment of the cavity are too well known to require explanation.

118 Madison Avenue.

THE INDICATIONS AND ADVANTAGES OF THE INTRA-NASAL OVER THE RADICAL OPERATION IN THE TREATMENT OF CHRONIC EMPYEMA OF THE ANTRUM OF HIGH- MORE AND THE TECHNIQUE TO BE EMPLOYED*†

BY J. H. ABRAHAM, M. D., NEW YORK.

The diversity of opinion as to the various operative procedures, the indications and advantages of one method over another in treating chronic empyema of the antrum of Highmore, are the primary reasons why we have been requested to participate in this discussion.

The various arguments and logical deductions presented to you in these papers, demand careful consideration and thought. If the suggestions about to be offered are found deficient, we are willing to abide by your just verdict.

The cardinal rule governing the selection of any operation, provided the results obtained are equal, is pre-eminently conservatism. This, gentlemen, leads me to my first argument, a consideration of the anatomic relationships of the intra-nasal as compared with the canine fossa route and the advantages thereof.

The antrum of Highmore is a large cavity situated in the body of the superior maxillary bone, and is pyramidal in shape. The base is directed towards the nose and is formed by the external wall of the nasal cavity, the floor by the alveolar process. The external wall by the facial surface of the superior maxilla. In approaching this sinus it is absolutely necessary that the surgeon should be familiar with these surfaces.

In order to enter the antrum by the canine fossa route the removal of one or more teeth is often indicated. The incisions through the soft structures and bone cut through several branches, and frequently the trunk of the infra-orbital nerves and arteries. In removing the large plate of bone necessary in this operation, we destroy branches of the posterior, middle, and anterior superior dental nerves. The size of the antrum may be so great that it may be in relation with the fangs of the teeth of the superior maxilla, from

* Read before the New York Academy of Medicine, Section on Laryngology and Rhinology, March 27, 1907.

† For Illustrations of Instruments referred to in this Article see THE LARYNGOSCOPE, March, 1907, page 241.

the last molar to the canine, and, as I have often demonstrated upon the cadaver, the fangs may protrude, 8 mm., into the cavity. The Caldwell-Luc operation is practically the above operation, plus the intranasal operation. Now, compare this operation with the nasal inferior meatus route where the removal of the lower border of the inferior turbinate as practiced by me, is indicated not only to favor the entrance into the antrum and facilitate the after treatment, but on account of the hypertrophy of this body which, pathologically considered, is invariably present. The advantages of the intra-nasal route anatomically considered are obvious to every Laryngologist. In adults, the promiscuous sacrificing of so valuable a structure as one or more molar teeth justifies our profound condemnation. The exposed fangs of the teeth that are in relationship with the antrum, the cut branches of the dental, and infra orbital nerves, the extensive incisions through the soft structures and bone, are in my estimation a decided disadvantage, and they place in disfavor the radical operation.

The second indication which I consider of great importance is a thorough understanding of the pathologic lesions involved in chronic empyema. It is not my intention to burden you with a detailed description of inflammation, but merely to draw your attention to a few facts. The primary function of the mucous membrane of the antrum is the elaboration of mucus. It also acts as a protecting covering. Any diseased condition of this mucosa alters its normal physiologic function. Nearly all pathologic lesions of the antrum are inflammatory in character. Therefore, we are justified, from a clinical standpoint, in classifying them into acute and chronic inflammations. Pathologically, the chronic variety is either a sequel or a result of long continued irritation.

The most common etiologic factor as a causative agent in the production of inflammation is undoubtedly infection. In chronic supuration of the antrum we observe extensive pathologic changes, which vary with the individual case. In degree, the changes are far greater than in the acute stage. In the majority of cases, we find the typical pathogenic membrane while the mucosa is often thickened and presents a granular appearance. In a given number of cases connective tissue replaces a considerable portion of the glandular elements. Usually springing from the thickened mucosa we often observe a villous and fungoid growth, while in some cases polypi are found: in others, extensive granulation, and lastly, the great bug-bear of the general surgeons, caries, is found, but in my ex-

perience in very few cases, and generally those that can be traced to a dental origin. No less an authority than Zuckerkandl in his valuable work on "Normale und Pathologische Anatomie der Nasenhöhle" says that in all his dissections he has never observed a single case of caries resulting from empyema of the antrum.

In my series of cases, caries was detected in only three and these of dental origin and were operated on through the nose. The teeth were extracted and the carious bone curetted and I obtained a radical cure in all of them.

What are the advantages from a pathologic point of view? My clinical experience fails to demonstrate one single advantage pathologically considered in favor of the radical operation, as I have never detected caries that could not be traced to a dental origin. The remaining lesions can be and are successfully treated according to the modern surgical principles by the intra-nasal route.

The third and last indication in favor of this operation that I will present for your consideration, are the surgical indications. The canine fossa operation produces a far greater amount of shock than the simple intra-nasal operation. The time required for the simple nasal operation after cocoanizing varies from three to ten minutes only. Surgeons fully appreciate the great advantage of proper drainage in all infected wounds; therefore, I wish to emphasize this fact, and claim that the intra-nasal operation furnishes as good drainage as can be obtained by the canine fossa operation unless the surgeon removes all the bone, down to the alveolar process, and exposes the fangs of the teeth. This latter operation often results in a painful odontalgia nervosa. (These statements I am fully prepared to defend by numerous dissections in my possession).

Inspection of the antrum through the canine fossa is a direct and ideal procedure; nevertheless, with the aid of a small mirror a complete inspection can be obtained from the nasal cavity.

Repeated packing with gauze as advocated and practiced by a number of operators in the canine fossa operation is, in my estimation, an unsurgical and unscientific procedure, absolutely contra-indicated according to the modern principles of surgery and by the pathologic lesions that are involved. By this method infection is favored by the surgeon and repeated packings produces an unnecessary element of pain. Oozing of pus or secretions from the antrum and the dropping of the gauze into the buccal cavity are most distressing to the patient and very often cause gastric disturbances.

Edema and cellulitis often follows the canine fossa operation, while it has never occurred in a single case that I have operated on through the nose. The patient is unable to treat his antrum through the canine fossa and obtain a favorable result, while through the nasal cavity it is a very simple procedure and the results obtained are good.

Lastly, by repeated packings of the antrum do you intend to eliminate the cavity through the development of healthy granulations, or by removing the gauze and repeatedly curetting the granulations and mucosa, thereby producing excruciating pain, is it intended that the patient should be cured?

In the year 1895, I performed my first radical operation upon the antrum of Highmore and continued to operate by this method until the year 1897. My results were not entirely satisfactory. The pain and discomfort to the patient and the frequent failure to obtain a radical cure, in conjunction with the time required, were the primary reasons why I adopted the intra-nasal route. My first operation upon the antrum of Highmore through the nose was performed in the year 1896, while attending Prof. Krause's clinic in Berlin. To me, this operation was an ideal and simple one for acute cases of empyema of the antrum, but insufficient for the chronic cases. Therefore, on returning to America in 1897, I outlined a plan of treatment, and invented a series of instruments, both of which have since been modified. Since then I have treated successfully 34 cases. This number may seem small to you, but it is limited to those cases operated on and treated by me until discharged, cured. The number of cases operated on by this method could be increased twofold were I to include the majority of clinical and a few private cases that discontinued their treatment shortly after the operation for reasons that no surgeon can control.

The operation as performed by me is an extremely simple surgical procedure. Therefore it affords me pleasure to present my technic in detail. After thoroughly cleansing the nasal cavity, thin pledgets of cotton are saturated in a 5% cocaine and 1-4000 adrenalin chloride solution. A pledget is placed in the middle meatus in the region of the ostium maxillare and another larger is carried underneath and then external to the inferior turbinate body, and pressed against the entire surface of the naso-antral wall, below the attachment of this body. Lastly, the inferior surface of the lower turbinate and antero-inferior angle of the septum are cocaineized. After removing the pledgets of cotton from the middle meatus, needle No.

1 or No. 2 is directed to the middle meatus just below the inferior ethmoidal turbinate, the point hugging the upper convex surface of the inferior turbinate, about three centimeters from the floor. The point should be directed toward the inner wall of the antrum, then with gentle pressure outward with a distinct downward inclination. The point of the instrument will enter the antrum without the least resistance. Thoroughly syringe or douche the antrum with a warm normal salt solution, by connecting attachment No. 7 or No. 8 in order to remove all purulent secretions, then drain the cavity by directing the patient to bend his head sideways with a slight inclination of his face downward so that the diseased cavity will be uppermost. Reverse this position of the patient's head, and through the needle inject the cocaine adrenaline solution, allowing same to remain in the cavity from two to five minutes, depending on the patient's susceptibility to cocaine anaesthesia. Then allow the patient to sit erect, and bring his head to the normal position. A sterile towel is placed around the head so as to cover all of the hair. Then remove the pledgets of cotton remaining in the nasal cavity, and begin your operation by removing the lower border of the inferior turbinated body with my modified Struyckens forceps or any practical nasal cutting forceps down to the bone, and if necessary remove a small portion of the bone. In a majority of cases it is unnecessary to remove the bone. The next step in the operation is to perforate the bony naso-antral wall with the reamer. This instrument is inserted into the nasal cavity with the point directed downward to the floor of the nose and then carried backward $1\frac{1}{2}$ to 2 centimeters from the nasal vestibule; the point is then rotated outward underneath the inferior turbinate through a little more than one-quarter the circumference of a circle. Grasp the patient's head with your left hand, the handle of the reamer with your right hand then plunge the point of this instrument through the bony wall, rotate the hand upward and downward, exerting your pressure on the point of the instrument, outward and then backward, until you make an opening $\frac{1}{2}$ to 1 centimeter in diameter. Withdraw the reamer, and insert the burr into this opening, hold the instrument and the patient's head in the same position; now remove the posterior portion of bone by exerting your force on the burr from above, backward and downward. To remove the anterior portion of bone, reverse this procedure. The upper and lower portions of bone are removed simply by scraping the bone to and fro. The diseased mucous membrane of the antrum is gently curetted with a Myles mal-

leable curette. Wash the antrum of all debris through the silver canula No. 6 or hard rubber canula No. 5. Pack the cavity direct with a $2\frac{1}{2}$ centimeter gauze.

POST OPERATIVE TREATMENT.

To prevent pain and excessive loss of blood, ice compresses are placed upon the cheek bone; a small dose of morphine is indicated in order to counteract the depressing action of the cocaine. After twenty-four hours, a 5% oil of turpentine dissolved in steril olive oil is dropped upon the gauze every three hours to facilitate the removing of the packing on the third day. After removing the packing, the cavity is syringed with a normal salt solution. On the following day and days thereafter, the antrum is cleansed with a boracic acid solution and then thoroughly dried with pledgets of cotton. The mucous membrane of the nasal cavity is sprayed with a non-irritating oil, preferably albolene, and then a weak solution of nitrate of silver is syringed into the antrum so as to come in contact with the membrane lining the entire cavity. If any solution remains it should be absorbed with cotton.

Day by day the strength of this solution is increased, until the mucosa assumes a normal appearance. A few dry treatments with Pulvis Thymo-Iodol is all that remains to cure your patient and leave him the proud possessor of a practically normal antrum of Highmore.

616 Madison Avenue

SOME POINTS ON THE RESECTION OF THE CARTILAGINOUS SEPTUM.*

BY D. BRADEN KYLE, A. M., M. D., PHILADELPHIA.

It is my purpose in this paper to call attention to a few points in connection with the resection of the triangular deflection of the cartilaginous septum, and it is to this particular form of septal deflection that my remarks apply, and I do not intend this paper to cover any other form of deflection.

The resection of a portion of the triangular cartilage is by no means a new procedure, but recently there has been a tendency to advocate, I think, a too radical method. The saving of the mucous membrane and a portion of the cartilage, also the prevention of scar tissue, is the essential features in this operation. In the triangular deflection much difficulty has been experienced in freeing the mucous membrane at the point of angle and at that point there is great danger of perforation and ulceration. In such cases I have followed with excellent success the following method: By forcing the finger into the occluded nostril the triangular cartilage can be shoved over sufficiently to force it out on the open side. I then make an incision through the mucous membrane, just a little beyond the junction of the skin and mucous membrane, cutting down directly over the anterior edge of the triangular cartilage. By stretching open this incision and making pressure with the finger in the occluded nostril the cartilage can be pushed forward through the incision. It is extremely necessary in order to dissect successfully the mucous membrane from the cartilage that the incision should be carried through the perichondrium to the cartilage; once this is done the mucous membrane can be stripped from the cartilage very easily. Personally, I prefer the dural separator to any of the knives devised for the purpose. My reason for this is that it is more flexible, blunt pointed and less likely to cause perforation. When the mucous membrane is dissected back on the occluded side to the apex of the triangle, then, instead of trying to dissect around the angle, I force the cartilaginous septum over into the median line by means of the nasal dilator. By doing this two or three times the septum is sufficiently pushed over or rendered sufficiently pliable that it can be held almost in the median line by pressure from the finger. You will notice that the cutting and dissection has all been done through the wide open nostril on the opposite side from the obstruction, there being no incision made on the obstructed side. The mucous membrane, up to this point, is already separated from the cartilage back

* Read before the Section on Otolaryngology of the College of Physicians, Philadelphia, April 17, 1907.

to the angular part of the deflection; at this point some difficulty is usually experienced, owing to the fact that the mucous membrane having been subjected to irritation by continued chronic inflammatory changes, is adherent. This tendency to adhesion is more marked usually at the floor of the nose. Then after the septum is shoved over and the angle reduced to a straight line, begin the resection over this point at the top of the septum. There less adhesion will be found and you can get past the line of the angle and dissect from above downward, keeping the little finger in the originally obstructed nostril so as to keep the septum as nearly in the median line as possible and the finger is also kept directly over the wide blade of the separator. In this way you will avoid perforation and do away with all triangular dissection instruments. If the mucous membrane is dissected back of the apex of the angular deflection you are now ready to use the swivel-knife for the removal of the cartilage. Personally, I prefer to start at the floor of the nose, cutting the cartilage free back past the point of the greatest deflection, then, instead of carrying it up to the highest point of the cartilage, I cut diagonally toward the tip of the nose; this removes a triangular piece of cartilage, but leaves the upper portion of the cartilage for nasal support. I have had no trouble with a tendency of the remaining portion of the cartilage to deflect either way. It is not necessary to use any intranasal tube or splint for support. The only wound that has been made is the one in the open nostril almost at the junction of the skin and mucous membrane. In order to hold the mucous membrane in place, I always put in three or four sutures, allowing them to remain from two to four days.

As you can readily see, there is no injury done to the mucous membrane, and this lessens the tendency to ulceration. As I said in the beginning, this paper has only to do with this particular kind of deflection. I certainly do not agree that the entire cartilage should be resected, and as I have seen evidence of the tendency of the drooping of the nose when the entire cartilaginous support has been removed. In this method the support is still retained and the primary object of the operation, that of establishing nasal breathing, has been accomplished. Another great advantage is that very few instruments are required, as I have repeatedly successfully performed this operation by the use of a cutting blade for the first incision, Allis dry dissector, dural separator, nasal dilator and the swivel-knife, occasionally using the small alligator biting forceps for the removal of small pieces of cartilage.

MODERN PROCEDURES IN EXCISION OF INTRINSIC MALIGNANT GROWTHS OF THE LARYNX.*

BY J. SOLIS-COHEN, M. D., PHILADELPHIA, PA.

Modern procedures exclude all attempts at intralaryngeal extirpation of intrinsic malignant growths of the larynx as virtually futile, except under fortuitous conditions not to be expected. Hence, direct access from the exterior is to be practised in consonance with general surgical principles.

This procedure comprises a central division of the thyroid cartilage, and sometimes of the cricothyroid membrane, cricoid cartilage or even of the trachea, as may be requisite to fully expose the morbid mass and its immediate surroundings when the wings of the thyroid cartilage are separated with retractors or with stout loop ligatures.

This may be done under either local or general anesthesia, and with or without precedent tracheotomy; the choice being dependent in great measure on the location and apparent extent of the neoplasm, and in part on the predilections of the operator.

For many years the writer's preference was for prophylactic tracheotomy several days in advance of the main operation, in order that the patient might become accustomed to the presence of a canula, the retention of which might be requisite for an indefinite period. This opinion, however, has been proven erroneous. Prophylactic tracheotomy is not requisite except where strong indication exists for the precautious use of a tube after operation.

The operative and postoperative technic has become so simplified of late, that the tracheotomy safety tube may be permanently withdrawn in most instances when the operation has been completed. Nevertheless, a properly prepared canula should be at hand for prompt introduction should contingencies arise requiring it. In such instances as seem to demand retention of a canula, a fresh one should replace the tube used during the operation.

Forty years ago, the writer reported¹ the extirpation under ether of a fibroid growth from the interior of the larynx under access by thyrotomy without any tracheotomy whatever; and on the seventh day the patient, a journeyman shoemaker, was working at his last;

* Read at the Twenty-ninth Annual Congress of the American Laryngological Association, Washington, D.C., May 7, 8 and 9, 1907.

¹ *New York Med. Rec.* 1867, p. 218.

having been able to sit up within less than twenty-four hours after the operation, and to take a walk in the street upon the fourth day. In this case, as in most of the few other cases upon which the writer has operated, the growth was removed with forceps and scissors; and no stitch whatever was taken in the thyroid cartilage or in its perichondrium.

The immediate technic of operating most in vogue at present is to begin under chloroform-inhalatory anesthesia with an incision through the skin from hyoid bone to some distance down upon the trachea. Then a tracheotomy is performed and a tampon canula inserted. The thyroid cartilage is then thoroughly exposed and divided in the median line with bistoury, saw, scissors, or cutting pliers. The wings of the thyroid are separated with retractors or with strong ligatures; cocaine solution is applied to the interior of the larynx to control reflex movements, which otherwise are often very embarrassing during the dissection; adrenalin solution is subsequently applied to contract the bloodvessels and lessen the immediate hemorrhage of the excision, while at the same time it facilitates definition of the growth. Under careful retraction of the sides of the larynx, with the best available illumination whether natural or artificial, the entire diseased tissues are exposed to vision, and removed with a surrounding zone of healthy tissue sufficient to secure the patient immunity from immediate recurrence *in situ*.

The writer continues to prefer his own method, which is to begin with an ordinary tracheotomy in the first place if the patient is not wearing a canula already, and, after introduction of the canula, to incise the skin only so far as to uncover the larynx; thus leaving intact a broad bridge of skin above the canula. This lessens considerably the dimension of the external wound and favors reunion in the sequence. Should due exposure of the morbid parts require it, this bridge can be cut into, or be sacrificed entirely, but in the majority of cases it can be spared.

Tracheotomy having been performed, a tampon canula is to be introduced to occlude the upper portion of the trachea; preferably Hahn's sponge covered canula kept in an aseptic solution during the early steps of the operation so as to moisten the sponge. According to conditions, some little time, usually ten to twelve minutes, will have to elapse before the sponge becomes swollen sufficiently to fulfill its purpose and occlude the trachea from the entrance of blood. This time is utilized in exposing the thyroid cartilage, and getting it ready for division.

Hemorrhage having been controlled, the thyroid cartilage is divided in the middle line with strong obliquely bent short cutting pliers, the lower blade being first thrust through the cricothyroid membrane and passed up to the incisure. In young people, a stout bistoury will suffice. The wings of the cartilage are then held asunder with retractors, firmly but gently, and if the exposure be insufficient for careful manipulation, the cricothyroid ligament and, if necessary, the cricoid cartilage may be divided to afford the required access to the parts. These parts being duly exposed, the interior surface of the larynx is freely mopped with a solution of cocaine until the reflex movements are under control, and then the morbid mass and half an inch or more of surface around it should be mopped with a solution of adrenalin to diminish hemorrhage and define the growth. When saliva and mucus flow too rapidly in the larynx for control with mopping by an assistant, a tampon secured to a ligature for easy withdrawal can be pressed into the power part of the pharynx so as to occlude it and absorb the secretions. In the few instances operated upon by myself this tamponing has not been necessary.

Bleeding and secretions being under control, the excision can be begun. The usual method is to surround the parts to be removed with an elliptic or oval incision down to the perichondrium, and so excise the mass with scissors or bistoury as to remove it together with the underlying mucous membrane, and then carefully scrape the perichondrium and apply an escharotic. My own preference is, when practicable, to strip the inner perichondrium from the wing of the thyroid cartilage under the entire surface of the parts to be removed, raise the mass intact and sever it with serrated scissors at a distance, as far as may be, of about half an inch from the growth which is left untouched by any instrument, so that it is removed in one piece looking like a miniature mass of flesh upon a fleshy plate. If the growth be located in the anterior or central portions of the half of the larynx, the denudation of the internal perichondrium can be begun from in front with an elevator or a dull pointed dry dissector such as Allis's, which is then worked underneath until the whole of the portion to be severed has been raised from the cartilage. In cases where the growth is too far removed from the line of the thyrotomy incision, the elliptic incision to surround the growth may be made so as to extend through the perichondrium, and the perichondrium can then be attacked at the most accessible point, first with a sharp elevator and then with the blunt dissector.

After the removal of the morbid mass and the drying of the parts, the raw surface is thoroughly mopped with compound tincture of benzoin, and the wings of the thyroid are allowed to reapproximate. The tampon canula is now withdrawn from the trachea; and if breathing be comfortable no attempt is made to introduce another canula unless contingencies arise for it in the after treatment.

Should the adjustment of the wings of the thyroid cartilage be accurate there will be no necessity for taking stitches in the cartilage or in the external perichondrium to keep them in place. The natural resiliency will suffice, for cough occasions less disturbance than is theoretically surmized. Should the wings of the cartilage override, however, it will be necessary to insert sutures to keep them in correct apposition.

In my own practice, no stitches are taken in the skin wound. Instead, a longitudinal strip of perforated plaster is placed along each side of the neck an inch or so from the line of incision, and then this plaster is sutured in several places through the perforations, along the line of thyrotomic incision, and tied only so tight as to bring the severed edges of skin into gentle apposition, and leave the wound free for easy and immediate inspection. No threads are passed over the line of the tracheal incision, which is left bare to favor expulsion of matters from the air passages. A pad of gauze moistened in bichloride or other antiseptic solution is then placed upon the wounds, while a broad strip of aseptic gauze is doubled over a narrow strip of adhesive plaster and secured to the neck, so that the gauze hangs down over the dressing upon the seat of the wound. In this manner, there is no strain upon the skin from stretching of sutures, and the parts are readily accessible to inspection and manipulation.

The bed of the patient should have the foot portion raised so as to insure the flow of secretions towards the mouth and away from the air passages, and be so maintained as long as necessary. The patient should be placed near the edge of the bed, lying upon the side of operation, and without a pillow under the head. When thirsty, an attempt may be made to draw sterilized water up into the mouth from a bent tube inserted at its lower edge. This will sometimes be practicable within a few hours, and then suitable nourishment can be administered in the same way until cicatrizations are sufficiently advanced to allow the use of more solid food. Should this plan be impracticable, nourishment should be administered by the bowel for a short time, or until deglutition becomes safe.

The post-operative treatment is as important as the operative procedure, and therefore the operator or a sufficiently skilled as-

sistant, should be within immediate call at least during the first twenty-four hours to combat any adverse conditions which may arise, although it will often be the case that nothing untoward does occur. But when anything untoward does occur, the presence of some one able to meet the emergency may be a matter of vital importance. Should it become necessary for any reason to reintroduce a canula into the trachea, which has to be maintained for several hours or longer, some method for moistening the atmosphere near the head of the bed should be provided, if necessary, to prevent the secretions from dessicating, and a piece of moistened gauze can be kept over the orifice of the canula. The external parts are treated on general surgical antiseptic principles, and although cicatrization by granulation is to be more or less expected, a large extent of the external wounds often heals by first intention, sometimes comprising the entire thyrotomic portion, thanks to the absence of constricting strictures even in the upper portion of the cutaneous wound. and to the bridge of tissue preserved between the incisions for tracheotomy and for thyrotomy.

Under favorable conditions, the patient should be able to sit up in three or four days, and to be practically recovered from the operative procedures in from two to six weeks.

In the description of this method, it will be observed that much has been learned from the experience of M. Butlin and Sir Felix Semon as reported during recent years; especially the preference of preliminary to prophylactic tracheotomy, the use of the loop of ligature in spreading aside the wings of the thyroid when the retractors are insufficient, and the removal of the tracheotomy canula immediately after the extirpation of the growth and attention to the wound of excision.

The retention of the skin bridge between the incisions for tracheotomy and for thyrotomy, the removal of the growth in mass upon a plate of excised perichondrium and superjacent tissue, the dressing with compound tincture of benzoin, the avoidance of sutures in the cartilage and in the skin, and the special method of loosely approximating the edges of the incisions together are the chief points of variance from usual methods in the practice of the writer.

1824 Chestnut Street.

NON-RECURRENT CARCINOMA OF THE LARYNX REMOVED FROM THE NATURAL PASSAGES.*

BY E. FLETCHER INGALS, M. D., CHICAGO, ILL.

The results of treatment in carcinoma of the larynx are generally so bad that it is a pleasure to be able to report a case in which there has been no recurrence of the growth for over a year after its removal by endolaryngeal methods, even though nothing in the operation or treatment of the case can be presented as of special interest.

The patient, K. P., was a laborer 44 years of age, who came to me on the 2nd day of January, 1906, complaining of marked hoarseness which had lasted for 6 years. There had been no pain until within the previous three weeks during which time he had suffered some pain in the region of the left half of the hyoid bone. He was not conscious of having taken any cold but stated that he had had catarrhal symptoms for some time and that the nasal cavities had often been obstructed although at the time of his visit they were better. His general health was good. There was no dyspnoea, the appetite and digestive organs were normal. He stated that the hoarseness had been variable; sometimes having been so bad that he could talk only in a whisper, at other times his voice was much stronger, but continually hoarse. There was nothing in the hereditary history to account for the condition and there was no evidence whatever of lues. The patient's habits were good; he had formerly smoked tobacco but had given it up three weeks before he called upon me and had never been accustomed to inhaling the smoke. He stated that his usual weight was 165 pounds and he weighed $163\frac{1}{2}$ at the time of his first visit. The temperature was normal, pulse 68, regular and normal. There was hoarseness and a slight hacking cough, but no dyspnoea. Upon inspection, I found the nasal cavities about half closed by swelling of the turbinated bodies but this gave him no inconvenience. There were no thoracic symptoms. Inspection of the larynx showed a pinkish gray tumor involving the anterior five-sixths of the left vocal cord filling the opening of the ventricle and extending inward so as to considerably obstruct the glottis, and crowding outward into the ventricular band.

* Read at the Twenty-ninth Annual Congress of the American Laryngological Association, Washington, D.C., May 7, 8 and 9, 1907.

This was about 15 m. m. long by 8 m. m. wide and apparently about 6 m. m. in thickness. Some blackish areas on the surface were apparently caused by coal soot. The growth had the appearance of malignancy but it had been present so long that I hoped it might be a simple papilloma. I removed the greater part of it at the first sitting and submitted it to Prof. E. R. LeCount of Rush Medical College for examination. After the operation I directed the patient to keep an ice pack on the neck for 24 hours. He returned two days later, and at that time I was able to see the greater part of the left cord perfectly, but a small part of the growth, about 6 m. m. in diameter, remained at the front end of the cord and a piece something smaller at the back end. At this time I removed all remnants of the growth from the back end of the cord and about half of that from the front end, but could not secure all of it because of the bleeding. The patient returned two days later, at which time he complained of considerable soreness of the larynx, therefore I merely applied a mild solution of zinc sulphate. A similar application was made at the next visit two days later. I did not see him again for a week. In the meantime, I had received a report from Prof. LeCount that the neoplasm was a slowly growing carcinoma with growth toward the surface and considerable Kerato-hyalin transformation of the epithelial cells. At this time I found a growth at the anterior end of the left cord larger than at the last visit, which I removed thoroughly with a special Mackenzie forceps. After removing this, I found there was a growth of about the same size just below the vocal cord. This I also removed with Mackenzie forceps. I again advised the cold applications to the throat. When he returned four days later he was very hoarse. There was about 15% congestion of the left cord and about 5% of the right. Some roughness of the edge of the left cord which had been noticed at a previous visit had disappeared and no remnants of the growth could be discovered. A mild astringent application was again made. When I again saw him, eleven days later, the left cord was still swollen and the congestion of both cords was a little more pronounced than it had been at the previous visit. I gave him a small inhaler charged with 5 grains of iodine and 20 grains of menthol, which he was directed to use 5 or 6 times a day. This he continued for several months. Two weeks later, there had been no reappearance of the growth but the congestion in the larynx was still more than when I had last seen him. He stated that he had just suffered an attack of influenza, which probably accounted for the increased inflammation. I di-

rected the inhalation to be continued and made a mild astringent application to the larynx. I saw him again in a little over three weeks, at which time the congestion had considerably diminished. Three weeks later, the voice was noted to have been clearer and the patient stated that he was at his regular work daily. I did not see him again for a little over two months, at which time it was noted that the voice was continually growing clearer and he stated that he could sing, something that he had not been able to do before for many years. The cords, however, were still congested about 8% and both of them were slightly thickened. There was no return of the growth. I did not see him again until Jan. 28, 1907, over a year after the operation. He had been on the Pacific Coast for several months and stated that for the last 3 or four months his throat had been perfectly well. His voice, he said, was as good as it ever had been. I found no evidence of return of the growth. In response to a letter, he called again on the 14th of February, at which time he stated that the voice continued as good as ever. But I found that there was slight thickening of the vocal cords and congestion of about 15%, apparently due to a recent cold; however, there was no evidence of any return of the growth.

Although interference with malignant laryngeal tumors is likely to stimulate their growth, it appears to me that when there is doubt of the pathology and conditions are such that we have a hope of removing the neoplasm thoroughly by the endolaryngeal method, this operation should be chosen. If microscopic examination reveals malignancy and the tumor speedily returns, laryngotomy or laryngectomy should be at once advised if there is reason to believe that a thorough removal can be effected. By adopting Dr. Cohen's operation, I believe we shall be able to save many patients by early laryngotomy.

34 Washington street, Chicago.

FAVORABLE EFFECT OF TRYPSIN IN A CASE OF LARYNGEAL EPITHELIOMA; EXHIBITION OF CASE.*

BY HOMER DUPUY, M.D., NEW ORLEANS.

James O'Brien, white male, age 59. Personal history excellent up to December, 1905, when he became very hoarse, which condition persisted during the rest of the winter and into the spring of 1906; he attributed it to a cold. On May 26, 1906, patient presented himself to me for examination. Laryngoscope disclosed a growth in the anterior commissure of the larynx. Its point of origin was subglottic and to the right side of the median line. It was firm and pale in appearance and in size approximated an averaged sized pecan. There was a shadow of doubt as to its neoplastic nature, and even with a negative history of syphilis, he was put on the iodide of potash, 50 drops three times a day and protoiodide of mercury one-quarter grain, for a period of four weeks without any perceptible impression on the growth. He consulted another physician and during June and July local treatment in the form of spraying was resorted to. He returned to me about August 4th, 1906. The growth seemed to have increased and, in fact, protruded into the glottis anteriorly. Malignancy was suspected and thyrotomy advised.

On August 15, 1906, at the Eye, Ear, Nose and Throat Hospital, I opened the larynx by an external operation and found a greater extension of the growth than was at first revealed by the laryngoscope. The anterior third of the right true and false vocal cords were involved. The growth seemed to arise from the right ala of the thyroid cartilage, near the median line along the anterior commissure. These involved structures were excised and thorough curettage practiced at the point of origin over the cartilage. While I regarded the case as one of the intrinsic variety, that is, in which the neoplasm is limited entirely to the interior of the larynx, its situation so near the median line made me fear recurrence on the opposite side. This actually occurred and by the middle of September, 1906, a month after the operation, the growth presented on the left side and progressed rapidly.

A specimen of this growth, obtained at the time of the thyrotomy, was examined microscopically by Dr. John J. Archinard, who re-

* Read before the Orleans Parish Medical Society, New Orleans, March 23, 1907.

portend it to be epithelioma, polyhedral in cellular arrangement. While I was seriously thinking of performing a total laryngectomy, I hit upon the idea of giving trypsin a trial. Before initiating this treatment, Drs. Gordon King, A. B. Gaudet, DePoorter and E. S. Keitz, severally, made laryngoscopic examinations. This was done to secure separate, corroborative and impartial evidence in noting the progress of the case. The first injection of trypsin (Fairchild's) was made October 27, 1906, a whole ampoule being used. A whole ampoule, or 20 minims, was used at each injection during the treatment. After the thirty-seventh injection, trypsin was discontinued and Holadin (extract of pancreas) given in capsules, 3 grs. each t. i. d. After a few days this was increased to 4 and 5 capsules a day. Holadin was thus given for 29 days. On January 21, I returned to the trypsin, giving 11 injections during that month. On February 1, I discontinued trypsin and returned to Holadin, giving the same dosage. February 18, trypsin injection was resumed, 12 injections being given from this date to March 4, when Holadin was again taken, to March 21.

It will be noted that I alternated in the use of trypsin and Holadin, the latter being given to reinforce the action of trypsin.

In all, to date, he has received 55 ampoules, or 1100 minims, of trypsin; 290 capsules, or 890 grs. of Holadin.

The injections were given hypodermically, first in one arm and then in the other, and so on exclusively. No severe systemic reactions were observed which could be directly attributed to the trypsin. During the first fifteen days of the treatment there were temperature variations ranging from 99° to 99.4-5°. Locally, the site of the injections sometimes showed some inflammatory reactions, without any suppuration. The injections were usually followed by burning sensations, more or less severe in character, but evanescent in duration.

Now, as to the changes in the growth: On the 12th of November, 1906, 16 days after the first injection, the growth appeared pale and harder, and had distinctly diminished one-half in size. After this observation, with the exception of marked pallor, no further change appeared in the growth until December 7, 1906 (41 days after initial injection), when the laryngoscope showed it to have still further diminished, as it no longer protruded into the glottis, but remained sub-glottic. These alterations continued until about January 21, when the laryngoscope gave the grateful information that the tumor

was no longer visible. This observation was confirmed by the visiting staff of the hospital.

It is now over two months without a sign of recurrence having set in. The remaining laryngeal structures appear normal. The patient naturally possesses a very husky voice, the result of a complete operative removal of the right vocal cord. His general condition is excellent.

Drs. Gordon King, A. B. Gaudet, DePoorter and E. S. Keitz re-examined the larynx March 22 and all concur with me that the tumor has totally disappeared.

The case presents some very interesting features: The situation of the growth in an accessible region brought it within a splendid field for frequent and exact observations. Its limitation to the inner structures of the larynx, without involvement of the related lymphatic glands, undoubtedly contributed to the favorable results. A thyrotomy disclosed the extent and malignant nature of the growth. Its rapid recurrence, the positive microscopic findings by Dr. John J. Archinard, and the laryngoscopic examinations of several competent witnesses, insures a correct diagnosis and safeguards the observed results. The absence of severe systemic reaction is worthy of note. It was the absence of these untoward effects, which Beard attributes to the toxin absorption, when the cancer cells are broken up by the trypsin, which made me desist from the use of the amylopsin preparations. We had best consider this as only an apparent cure, further extension of time being required to confirm the brilliant clinical results thus far obtained. The case is reported on its own intrinsic merits. It certainly encourages the trial of trypsin in selected cases. In these pioneer medical applications, we can only reach definite conclusions by the accumulation of personal experiences and mine may be an incentive to others.

N. B.: I will report further on this case, be the results favorable or otherwise.

141 Elk Place.

THE FRONTAL SINUS OPERATION.

BY MAX HALLÉ, M. D., BERLIN.

To the exceptions¹ which Dr. Ingals has taken to certain points in my paper,² and which he kindly sent me before their publication I desire to make the following reply:

The sentence "In the first place, it is a question whether the naso-frontal duct can be probed in a living person," as is seen from the context, is on the one hand a rhetorical question, and on the other takes into account the possibility of objections from other sources. In my paper, not only in the sentences immediately following, but also in subsequent paragraphs, I have definitely stated as my opinion that in nearly all cases of chronic empyema of the sinus frontalis the duct can be probed. In this, therefore, I agree perfectly with Ingals.

That I have not quite understood his method of opening the frontal sinus is correct only in so far that I have had a more favorable opinion of his method than I can now have after his recent explanation. I had assumed that Ingals, like myself, used a thin, flexible probe which was permitted to slide, as it were, of itself into the naso-frontal duct after having been bent to suit the naturally existing anatomical peculiarities. Ingals, however, used stiff steel probes which are bent in two definite positions, undoubtedly suitable, and with these he tries to reach the entrance to the frontal sinus. In a number of cases, he will certainly enter the duct smoothly; in others this will not be accomplished so easily, and in these difficult cases he will have to use more or less force. The danger of this, however, cannot be sufficiently emphasized. As the tabula interna is not infrequently very thin and the posterior wall of the sinus often extends low down (Fig. 1, a.) the possibility of injuring the dura is exceedingly great unless flexible probes are used, which bend to suit the anatomical conditions which may be present. The sad experiences of Schaeffer and others may be mentioned here.

Moreover, I had understood that Ingals, after sliding the drill over the probe, pulled the latter firmly to the front, on the one hand to remove as much as possible of the spina naso-frontalis interna as

1 THE LARYNGOSCOPE, April, 1907, p. 284.

2 THE LARYNGOSCOPE, Feb. 1907, p. 115.

far as it forms the lower and partly the anterior wall of the sinus,³ on the other hand to avoid the great danger that the drill which, according to Ingals' measurements, has a radius of 3mm., injure the tabula interna, directly upon which the probe in the sinus rests. If Ingals has met with no accidents in his cases, it is to be considered especially fortunate, since the stiff probe practically forces the drill to work upon the tabula interna against which it lies.

Finally Ingals, with his method, obtains an opening of only 6 mm., which is curved to correspond to the bend of his probe. This opening, moreover, is sufficient for a short time only, as all internal open-



Fig. 1.

ings tend to close very rapidly. Furthermore, it never permits the operator to gain a view into the frontal sinus to inform himself of its conditions, though this is of the greatest importance for the further progress of the case.

My method presents the following important differences from that of Dr. Ingals:

(1) Ingals uses stiff probes, with which he forces an opening, if necessary; I use flexible probes which shape themselves to suit the anatomical conditions.

(2) Ingals slides his drill upwards along the curved probe, and cannot see at all what injury may, perhaps, be done with the drill

³ At this point in my article there is an error in translation. In *THE LARYNGOSCOPE*, Feb. 1907, page 124, line 11, "for the anterior wall and the floor" read "the anterior wall or the floor", meaning that part of the anterior wall which forms the floor of the sinus.

posteriorly. I slide a protector over the probe, along which I proceed with a straight drill, so that I can see my work at all times and avoid all danger to the tabula interna or the orbit.

(3) Ingals obtains a narrow opening, which permits no view and must soon close itself. I get an opening corresponding to the entire breadth of the spina naso-frontalis interna, up to 3 cm., and can survey the frontal sinus to a large extent during the operation and for a considerable time afterwards.

Regarding all further particulars I refer to the original, in which all anatomical conditions and all possible objections, those of Ingals included, have been considered.

In closing I do not wish to omit the concession that Ingals has done very meritorious work in the effort to gain an internal opening into the frontal sinus.

Wilhelmstr., 146.

The following corrections should be applied to Dr. Halle's paper in THE LARYNGOSCOPE, February 1907, page 115.

1. Page 118, Maxillary Sinus, line 2; for "favorable" read "unfavorable".
 2. Page 120, line 9; for "periosteum" read "bone and nasal mucosa".
 3. Page 120, line 10; for "safety valve" read "valve or sail valve".
 4. Page 120, line 12; for "some time" read "a long time".
 5. Page 121, line 3; for "side or back" read "side and back".
 6. Page 121, line 6; for "Fig. 3c" read "Fig. 3d".
 7. Page 123, Ethmoid Sinus, line 7; for "treatments" read "operations".
 8. Page 124, line 11; for "and " read "or".
 9. Page 124, line 13; for "Figs. 1 & 2" read "Figs. 1 & 4".
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A BLUNT AND A CUTTING LARYNGEAL DILATOR AND A SELF-ACTING EPIGLOTTIS LIFTER.*

BY J. W. GLEITSMANN, M. D., NEW YORK.

The blunt dilator consists of a handle, to which are attached two parallel rods with a prolongation at right angles for insertion into the larynx. They form at their upper distal end a triangle, into which fits a heart-shaped piece, fastened to the third rod underneath, the movements of which are controlled by a ring for the finger. When the latter is drawn to its full extent towards the operator, the two stationary rods separate, and all three conform now to the natural shape of the glottis and are capable of dilating soft structures for inspection of the lower parts and temporary relief of dyspnoea.

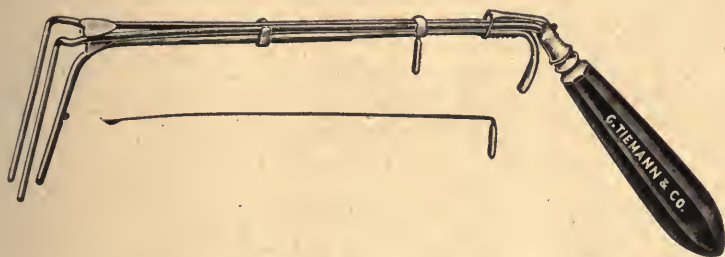


Fig. 1. Author's Blunt and Cutting Laryngeal Dilator.

The cutting dilator is intended for the severance of webs and of adhesions of the cords. It is constructed on the same principle as the blunt dilator, but the two upper rods are worked by a ratchet, which holds them in a firm position and allows the free use of the finger to develop the cutting knife. The latter is concealed in a small groove running the whole length of the third rod, and when drawn forward by pulling the hook to which it is attached, cuts easily through the obstruction, which is held in tension due to the spreading of the two other rods.

The epiglottis lifter, which I devised several years ago, was, in my belief, an original idea, till I searched a number of old publications at my command to learn what kind of instruments for this pur-

* Demonstrated before the Meeting of the Laryngological Section of the New York Academy of Medicine, March 27, 1907.

pose had been published previously, before demonstrating it to the section. I found that Tuerck and L. von Schroetter already had described similar instruments, although of a more complicated construction. But I could not see any mention nor drawing of their instruments in seven European and in no American catalogue of instrument makers. This circumstance and the fact that the instrument enabled me to make a correct diagnosis in one case and to perform an operation in another, which otherwise could not have been made endolaryngeally, tempted me to reproduce it.

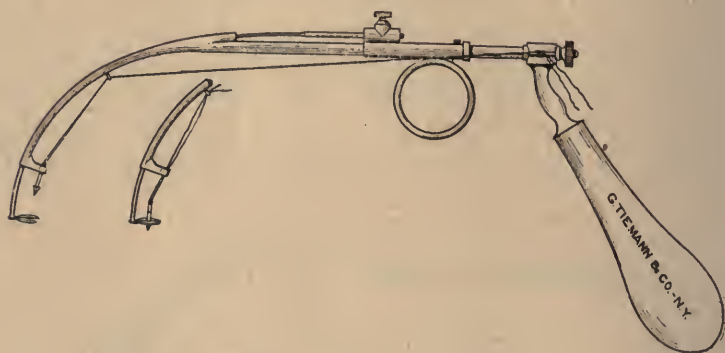


Fig. 2. Author's Self-Acting Epiglottis Lifter.

The accompanying drawing will greatly facilitate the understanding of its mode of action and make a lengthy description unnecessary. The cone-shaped needle has a hole at its base for the thread and a small needle in the middle, which prevents its slipping back after it has been pushed through the epiglottis and passed through the opening between the two springy plates. When the plates are now moved forward, the epiglottis hangs on the thread, the needle as well as the whole instrument can be withdrawn, and the thread with the epiglottis attached to it, be handed to an assistant, allowing the operator the free use of both hands.

616 Madison Street.

NEW ANTRAL CHISELS, WITH BRIEF REFERENCE TO TECHNIQUE IN OPENING THE MAXILLARY SINUS.*

BY ARTHUR M. CORWIN, M.D., CHICAGO.

We have come pretty well to understand that in case of long standing chronic suppuration of the maxillary sinus with extensive necrosis, granulation, polypi, cysts or new growths, the best procedure is a radical one permitting free inspection, palpation and use of instruments to eradicate the disease, preferably the Caldwell Luc operation as we know it or better still perhaps, its more recent refinement as devised by ¹Denker and described so well by ²Dr. Stolte at our February meeting of last year. It is equally true I think, that while in some 15 or 20 per cent of cases such radical interference is needed, in the vast majority of chronic suppurating maxillary antra, these measures are unnecessary and therefore to advise them is seemingly poor judgment, and to do them, bad practice.

In rare cases of highly excitable and nervous patients at least partial or transient general anaesthesia, whether demanded by the patient or not, is humane. But if this cavity can be opened and treated efficiently through the naris under local anaesthesia with little if any pain or shock or hemorrhage and no terrifying sense of a severe operation, it seems inexcusable to subject the patient to the greater danger and the after discomfort, etc., of the radical procedure.

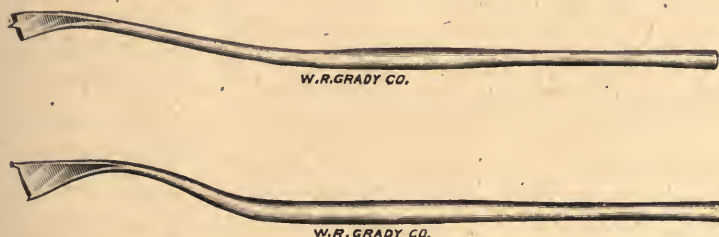
Is the idea of the nasal opening of this cavity an old one? It is perhaps all the more remarkable that only since 1900 has the naso-antral route for curettment, packing, drainage and ventilation found its definite place and come to be recognized as the route of election for the relief of chronic suppuration. ³Boeninghaus as early as 1892 had opened through the facial wall and ⁴Janssen in 1894 followed a similar plan. Hajke in 1899 and many others contributed confirmative articles and refinements of technique. ⁵Caldwell had in 1893 published the modest report of his new operation, which was to remain almost unknown until Luc's work and reports in 1896, '97 and '98. Spicer before the British Medical

* Read before the Chicago Laryngological and Otological Society, February 19, 1907.

Association in 1894 had advocated entrance by the facial route and just missed the glory of Caldwell and Luc in making a small counter opening through the outer nasal wall by throchar, without closing the facial wound.

Today the dictum is fairly fixed in our operative code, that as the antrum is normally in communication with the nasal cavity, permanent drainage, where necessary, should be made by that avenue and not into the more infective mouth. So that the ancient Meibom Cooper operation through a tooth socket, so long the chief property of dentists, and I had almost said a reproach to our profession, has finally received its tag and number and already gathers dust among rhinologic relics of the top shelf. Yet dentists still do it. The sacrifice of sound teeth for antral drainage as practiced a very few years ago is now very bad practice and alveolar opening is only to be tolerated transiently in the removal of diseased roots and necrosed bone in their vicinity, a counter opening through the nose, or facial wall and nose being made if cure is not affected within a reasonably short time. The same ban has been placed upon the so-called DeSault, Krüster method of prolonged opening for drainage and packing through the canine fossa, or any of the modification of this,² such as the operation of Kretschman and others, with or without counter opening through the nose. The nasal route to the antrum through a large opening but without resection of the anterior facial wall was advocated by Retzius some ten years ago following Zuckerkandl's suggestion to open through the middle meatus. So also we have others associated with drainage through the middle meatus, which procedure was no doubt suggested by the normal fragility of the "nasal fontanelle." But this school of operators, would seem to sacrifice good drainage, the chief desideratum, to ease of operating; and the results are correspondingly uncertain and unsatisfactory. Mere puncture by trochar, drills, trephine or trochar chisels as we practice it today following the lead of Krause and Friedlander is of diagnostic value for cleansing purposes in acute or mildly chronic cases or where the antrum has been for a short time simply a receptacle for pus overflowing from the frontal or ethmoid sinuses. But as a cure in chronic suppuration it is on a par with the alveolar route or irrigation through the normal or accessory meatus. Mickulicz was the first I think, to utilize the inferior meatus way to the antrum for free access.

R. Claoue of Bordeaux stated the operation in definite terms using trephine and forceps but confining the window to the inferior meatus. This was in reality but a modification of the procedure of Dr. L. Rethi of Vienna as described by him in 1901. This so far as I can find is the first presentation of the principal of a large permanent opening between nasal cavity and antrum reaching to the floor so as to give free ventilation and perfect drainage without a facial opening. He removed the anterior two-thirds of the inferior turbinate under 20 per cent cocaine and with gouge punctured the antrum, enlarging the area resected till it embraced the anterior part of both middle and inferior meatus without injury to the naso-lachrymal duct. To Rethi then are we indebted for this epoch making operation which has been done with slightly varying technique and good results by many in the last five years, notably Coakley 1902, Holbrook Curtis 1903 with trephine and burr, Escat 1904, Freer 1905 with trephine and burr or forceps.



It is my desire to add my testimony to the value of the Rethi operation and to emphasize its teutonic origin in both principal and essential technique. Incidentally I bring to your notice two Antral Chisels which I have found very helpful in performing the operation. I fancy these are unique in form though the use of the chisel is not a new idea in this field. These were patterned after models made from aluminum wire flattened at the end and bent as indicated in applying them to the nasal passage of a patient upon whom I had previously operated with trephine and forceps. The aim has been to obtain such curves in them as seem to be required in the average case. One is for making vertical cuts, the other for horizontal cuts. The total length of each is $5\frac{1}{2}$ inches, the blades about 1-3 of an inch wide, bevelled one way. They are used in either naris with equal facility. The vertical blade has a sharp

spike 1-16 of an inch long at its centre; the horizontal has a similar prong at each end of the cutting blade. These spikes rapidly penetrate the bone with a tap of the mallet fixing the position of the blade so that it does not slip as it otherwise would without them, for they necessarily attack the surface in a direction slightly off the right angle. Delicate enough to be applied easily under inspection, the shafts are sufficiently stiff to allow their being malleable just above the blade so that they may bend a little if need be to suit the case. However, I have found no cause for changing their curves in the six cases upon which I have used them successfully and Dr. E. F. Ingals has also employed them with satisfaction in two cases. The shaft is flattened in a plane parallel to the plane of the cutting edge which enables one to control the direction of the blade with precision. Each instrument has a double bend so that the force applied by the mallet to the handle is transmitted to the blade in another plane nearly parallel to it.

The inferior meatus as chosen by Claoue has appealed to me as offering an area sufficiently large in most instances for the establishment of an effective opening. The exception might present in those rather rare cases in which the laterally contracted, high arched palate, deep thick alveolar process, and narrow face, occurring in women oftener than men, suggest the presence of abnormally small antra with high floors approaching the level of the middle turbinated or at least above the level of the nasal floor. This combination as pointed out by a recent writer, is in contrast to the more common type of broad face, wide low palate, vertically shallow alveolus and low floored antrum, occurring most often in men. Careful study of each patient with these data in mind is essential, of course.

The following is a brief description of the technique of their employment. Anaesthesia is obtained by 20% cocaine in 1-1000 suprarenaline solution, applied on swabs with special care to make the application high under the inferior turbinated by small pledgets on slender applicators. Further applications of suprarenalin are made to render the operation in most cases nearly bloodless. Resection of anterior one-half or two-thirds of the inferior turbinated is accomplished by Casselberry or other good scissors, snare and Myles' forceps leaving a narrow flap of mucous membrane which has been elevated from the upper surface of the turbinated along its base. This flap is to cover the stump of resected turbin-

ate and greatly shortens its time of healing. I think the majority of us would avoid the removal of the entire inferior turbinate as recommended by ¹³Chevalier Jackson, M. D., of Pittsburg, and his statement that "most cases renew a functionally sufficient inferior turbinal in a few months and after a year no observer on looking into the nose could tell that a radical turbinotomy had been done" is misleading, to say the least, and not good advice to the young Rhinologist who may read his words. The outer wall of the inferior meatus exposed by the partial, anterior turbinectomy is then compassed by three incisions, one immediately below the stump of the turbinal and two vertical, in front and behind. The membrane enclosed by these is quickly and easily separated by a bent elevator and remains as a flap attached below and lying on the floor of the naris. A square or quadrilateral of the bony wall is next removed with the chisels. The anterior, lower, upper and posterior cuts being made in that order. The edges of this window may be further bitten off with forceps or chiseling according to the indication. The ridge below should be removed as far as possible, making the floors of the naris and antrum continuous. The cavity is irrigated through a bent aluminum tube with hot normal salt or other solutions suggested. The interior of the sinus is examined with a flexible bent probe. Such curettage is done as may be indicated. But especially the mucous membrane on the floor of the antrum up to the wall is removed. After further cleansing the flap of mucous membrane may be trimmed as small as need be and pushed through the window. Covered by a narrow strip of gauze, dusted with bismuth and moistened in vaseline, an ounce of which has been mixed with 20 minims of Pheno-Camphor (made by mixing equal parts of Camphor and Carbolic Acid.) The rest of the cavity is then packed with gauze of the same sort. The packing may be left for two or three days when it is removed with care to avoid displacing the flap. Further irrigation and loose packing is done as necessary. The successful implantation of the flap depends much upon the thorough curettment of the floor of the antrum, just beyond the window. This step is an important part of the operation as the fixation of the flap prevents closing of the opening by immediate epithelialization of its lower edge. Most of the subsequent care of the antrum is intrusted to the patient who quickly learns to insert an aluminum tube slightly bent at the end and flattened toward the other end to indicate to him the direction of the bend. A good irrigator is quickly and cheaply devised by ordering

4 or 5 feet of small rubber tubing. This can be weighted at one end by tying to it a good sized glass stopper. This is thrown into the receptacle containing the irrigating fluid which is set or hung at the required elevation. A wooden snap clothes pin makes a good cut off and a short section of glass tubing may be inserted into the irrigating end of the rubber tube so that the patient can establish syphonage by suction. The glass tube is then replaced with the aluminum irrigating tube.

Aluminum tubing about 3-16 of an inch in diameter outside may be purchased by the yard from dealers in this commodity. From this may be quickly made proper irrigating tubes by slightly heating to soften one end and giving it the desired curve, having inserted a piece of wire a little less in size than the diameter of the lumen.

The antral chisels were made for me by Grady & Co., 86 Wabash Avenue, Chicago.

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34 Washington St.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

Regular Meeting, March 27, 1907.

THOMAS J. HARRIS, M.D., CHAIRMAN.

PRESENTATION OF PATIENTS.

Dr. Abraham presented Mr. H., and Mr. C., private patients, and gave a short history of their cases.

Two Cases of Sinus Disease. By J. H. ABRAHAM, M.D.

CASE I. Mr. H., married, aged 51 years. Consulted Dr. Abraham on February 1, 1907, with the following history: Twenty-five years ago he suffered from a severe attack of nasal catarrh, which lasted three weeks, followed by a profuse left-sided discharge. Ten years later he had another attack on same side. April, 1905, he was struck with a piece of wood over the left cheek bone, followed by severe pain for several days. February, 1906, contracted la grippe and was confined to his bed one week, suffering from pain and profuse nasal discharge, chiefly on left side. The discharge continued till November, 1906, a piece of bone was discharged into his mouth from left cheek bone, followed by a marked odor and increase of the discharge from nose and mouth. Shortly afterwards the opening in his cheek bone closed and this was followed by a thick yellowish and very fetid discharge from left nasal cavity. This condition continued until February 13, 1907, when Dr. Abraham operated upon him by the intra-nasal route under 5% cocaine and adrenalin solution. A small carious piece of bone was removed from the outer surface of the antrum, the cavity curetted of all granulations and treated according to the method to be described in this paper. The patient was discharged cured on March 10th.

CASE II. Mr. C., age 28 years, single. Consulted Dr. Abraham on September 8, 1906, with the following history: About one year ago suffered from an attack of la grippe, with profuse bilateral nasal discharge. Before attack of la grippe he had complained of pain over both cheek bones, which he thought was due to his teeth.

The discharge came from left nasal cavity, but never ran from the right. In July, it became very thick, yellow and of a markedly disagreeable odor. It was necessary to use three to five handkerchiefs a day. On examination it was found that his right nasal cavity was filled with a thick yellowish discharge of a most disagreeable odor. On cleaning the cavity, he found it impossible to examine the spot on account of a large bulky mass which on closer examination he found was the naso-antral wall in the region of the middle meatus. This was incised and a large polyps bulged into the nasal cavity. The polyps was removed and the antrum probed through this opening and he found it filled with polyps and granulation tissues. The patient consented to be operated upon on Oct. 5th under cocaine adrenalin anaesthesia. The intra-nasal operation was performed and the cavity curetted. October 10, ethmoids were removed and found carious. The naso-frontal duct was curetted on account of a discharge from the frontal cell. The frontal and antrum were treated through the nose. The patient made a beautiful recovery and was discharged cured on December 29, 1906.

A Discussion on the Indications for and Advantages of the Intra-Nasal over the Radical Operation in the Treatment of Chronic Empyema of the Antrum of Highmore, and the Technique to be Employed.

- (a) **The Rapid Entrance of the Maxillary Antrum through the Inferior Meatus without General Anesthesia.** By H. HOLBROOK CURTIS, M.D., (*Published in full in this issue of THE LARYNGOSCOPE, page 354.*)
- (b) **The Indications for and the Advantages of the Intra-Nasal over the Radical Operation in the Treatment of Chronic Empyema of the Antrum of Highmore and the Technique to be Employed.** By ROBT. C. MYLES, M.D. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)
- (c) **The Indications and Advantages of the Intra-Nasal over the Radical Operation in the Treatment of Chronic Empyema of the Antrum of Highmore and the Technique to be Employed.** By J. H. ABRAHAM, M.D. (*Published in full in this issue of THE LARYNGOSCOPE, page 357.*)

JOINT DISCUSSION.

DR. SAMUEL LLOYD, in opening the discussion, said that he felt somewhat embarrassed by the fact that the readers of the papers

had suggested three different operations for the one route, and very much astounded at the armamentarium passed around as essential for the performance of these operations. He was also surprised to find that the question of the indications and treatment between the two routes seemed to resolve themselves into distinctive methods of getting in through the nasal route, with a general condemnation of the other operations. He was, however, pleased to note that the alveolar route had not been suggested, though it was referred to as a method of drainage. It is still advocated by the dental profession, but in his opinion should be condemned as utterly incomplete and inadequate. It seemed to him that there could be very little difference of opinion between the question of the nasal or the canine fossa route in disease of the antrum of Highmore in any case where the discharge is due to a hyperaemia of the mucous membrane, and where it is essential simply to obtain a thorough drainage of the cavity and so allow the mucous membrane to get back into its normal condition, by removing the irritating secretions with which it is constantly bathed. It makes no difference where the drainage is placed; and if it can be reached more readily by one method than another in any given case, that is the method of choice for the operator. The operation cannot be outlined for any set of men. One man's facility makes it easier for him to approach by one route than another, and he had better use the operation that comes easiest to his hand rather than to try others that may be more difficult for him.

There were, however, other things to be taken into consideration, which had only been suggested in the papers of the evening. Dr. Abraham had said that caries is infrequent. It is intrequent, but it does occur, and sufficiently often to make it necessary to have full inspection of the antrum. He had himself removed squama from the antra in four or five cases within a short period of time, and in another had taken out the orbital plate. In several, the floor of the antrum was found to be necrosed, due to caries of the teeth; in another case, he had taken out sections of bone started by periosteal conditions. Then, too, there were whole series of tumefactions that need to be treated in the antrum, where it was essential to get to the base of the growth, and cure the point from which it grows. The actual cautery is the best means of handling such cases, and he doubted whether it would be possible to cauterize a papillomatous growth through the intra-nasal route—at any rate not until we can get a much better illumination than he had yet seen.

Another condition that he had found equally important was an antrum which is divided into cavities with distinct septa coming

from the different walls, two or three from above, two or three from the side. These cavities may be more or less filled with muco-pus, and the depth may cause a great deal of difficulty in breaking them up so as to secure proper drainage. In such cases it was important that the approach should be made through a large opening, and it could best be made through the canine fossa.

Another point to be considered was the eruption of teeth into the antra. He had removed four or five teeth that had grown into the antrum itself, never having appeared below. It would have been impossible to have removed these through any other route. He had also taken fillings out of the antrum, where the dentist had filled the teeth and it had passed through the roots into the antrum, the composition or filling rolling over the top of the teeth and making a foreign body in the antrum which has kept up the suppuration. These conditions can only be observed by means of the more radical operation.

In regard to the facility of this method, it has been claimed that the cavity is not so easily kept clean as by the other route. Dr. Lloyd said that he did not at all agree with this statement. In the beginning, when the operation is first performed, the packing would prevent the ingress of food, and by the time the patient could attend to it himself he could thoroughly cleanse the antrum. It was an easy matter for him to clear the mouth first with an antiseptic solution and then cleanse the antrum. There is a rapid contraction until we get to a small valve-like orifice that allows exit from the antrum and at the same time renders entrance difficult. He had demonstrated by several patients that the rapidity of closure was fully equal to that of any other method. He does not use iodoform, and seldom packs unless a polypus has been removed, but gets along simply with the primary packing and irrigation of the cavity, and the proper drainage.

DR. BODINE said his experience in this line of work was limited, although it antedated the time when most of those present became acknowledged general surgeons in a special line. Some fifteen years ago he operated upon many cases, but since then they had been, very properly, sent to the special operators in this line. For many years he had not operated upon the antrum, for the reason that the operation was but one step toward the cure, and the after treatment required special office equipment and was long and tedious. He thought that Dr. Lloyd had failed to get the point of discussion as he understood it. The subject was empyaema and not

new growths or conditions which necessitated a wide exposure of the cavity. 'This infection nearly always came from the nasal cavity, rarely from the roots of the tooth.' Of course, if the trouble was due to a tooth, the proper method of cure was to remove the cause; but if it were due to an infection from the nasal cavity, the matter resolved itself principally into the proper method of drainage and ventilation of the antrum. The contention that drainage of any cavity should always be from the most dependent point, was more academic than practical. In contention of this point he would mention the cure of bladder infection by drainage through a suprapubic opening. Another broad surgical principle is to make the punishment fit the crime. A mild infection of the antrum does not deserve to lose a tooth, for such cases generally get sufficient drainage through an intranasal opening. He had been thoroughly convinced of this lately by seeing a case of Dr. Abraham. Assuredly a pain-taking, conscientious after treatment is more important than the position of the opening in the matter of cure. Curetting the antrum he believed opposed to good surgical principles. If you are dealing with caries, it is not necessary to curette. While if you are dealing with necrosis of the superior maxillary bone, it cannot be called an empyaema of the antrum, and should be attacked in other ways. He objected to packing the antrum with gauze, especially if the opening had been made through the mouth, because you would drain as much saliva from the mouth into the antrum as you would drain pus from the antrum into the mouth. It seemed to him, in a simple case, that is, a true case of empyaema of the antrum, the best route for drainage is through the inferior meatus of the nose. At least, this operation can be done painlessly with local anaesthesia. He added that he, as well as Dr. Lloyd, had been almost dumfounded at the armamentarium presented for the purpose of performing one simple operation. He had seen more instruments tonight than he has in his whole surgical kit.

DR. BEAUMAN DOUGLASS said that the question before the Section this evening was whether the intranasal route alone presents advantages over the route by way of the mouth, but as the first two papers dealt specifically with a particular operation, and did not discuss the indications or advantages between the two methods, he would pass them by and devote his reply to Dr. Abraham's paper. Dr. Abraham had devoted his comparison wholly to an intra-nasal actual operation and one which is called the canine fossa operation. This later operation is, however, obsolete today, for Dr. Douglass did not know any rhinologists who are doing the operation which Dr.

Abraham described as the canine fossa operation. The operation referred to deserves most *unqualified condemnation*. To leave an opening from the mouth into the antrum, entering through the buccal cavity, is unsurgical and unwise, and so far as he knew no one operating today would do that. Therefore, before discussing the advantages between these operations it would be necessary to say a word in regard to an operation via the buccal cavity which is done today. A horizontal incision is made through the muscle and mucosa and the mucosa lifted from the superior maxillary bone until the entire anterior antral wall is exposed and the infra-orbital nerve is seen; then the anterior wall of the antrum is removed upward to the foramen, downward to the roots of the teeth; posteriorly and externally to the malar ridge,—in other words, the entire bony surface of the anterior wall of the antrum is removed, and ready inspection of the antrum can be made. Now comes the treatment of the antral cavity by more or less thorough curettage, removal of all diseased areas and then closing up the antral cavity by suture of mouth wound after making an opening into the nose by removal of the inner antral wall and a part of the inferior turbinate body, so that at the end of the operation we have both arrived at the same result, only by different ways.

With this operation in mind—not the one which Dr. Abraham had in mind, let us compare this method with the one presented by the reader of this paper in the treatment of antral empyema. Most of the cases of ordinary empyema of the antrum of Highmore are curable without operation. Those which are not, and which have been irrigated time and again after puncture, require something more. Such a diseased membrane does not regenerate, for we find such membranes in the chronic polypoid condition, or in a chronic inflammatory condition, or in a condition of necrosis or sloughing. These cases require direct treatment, and these are the cases which come to the surgeon or rhinologist for operation. After he has exhausted his conservative measures comes the question: Shall these cases be approached by way of the mouth, after which an opening is made and the drainage arranged through the nose, or shall the operation be done through the nose? What are the disadvantages of the mouth operation? With fair technique, we have to do only with aseptic conditions. The wound always unites. The only disadvantage of the mouth operation over the nasal route in the work that I have done is the swelling and infiltration of the cheek, which usually occurs after the operation, persisting from ten days to two or three weeks.

An advantage is that the operation is clean. No matter how fine your armamentarium may be, there are certain cases where in operating through the nasal cavity you cannot make a clean operation. In spite of the instruments which had been shown tonight, the operators would probably acknowledge that there is at times more or less after sloughing from the nasal operation, for the bone is broken by the chisel, and small pieces cling to the periosteum within the antrum until they slough off. Such a condition does not occur when the operation is done through the mouth. Furthermore, the mouth operation is very much easier to perform in the hands of the unskilled or the beginner. It is not only easier, but inspection is more thorough and inspection of the diseased antrum is an important matter. Another advantage in the mouth operation is the ease with which the mucosa can be inspected and curetted. Notwithstanding Dr. Myles' experience, there are a number of cases, particularly of the kind where it was partially necrotic where the mucosa requires removal. Personally, Dr. Douglass said that he thought the mucosa ought always to be curetted, and he always does it. If the granulation is limited to a small area, which can only be determined by the mouth method, and not by the intra-nasal operation, of course the healthy membrane was not curetted, but only the granulations. He thought that curettage was a wise part of the treatment, and that it could only be done through the mouth and not through the nose. He thought that the cases operated by the mouth according to the method of Luc would compare most favorably with those operated by the intra-nasal method exploited in tonight's meeting.

DR. DELAVAN said that the method of operating through the nasal cavity was not a new one. It was in vogue in Berlin prior to 1890, and was practiced there by Prof. Hermann Krause with considerable success. Since then many new devices had been offered and new plans of operating had been proposed, but the operation through the wall of the nasal cavity into the antrum seemed to effect the desired end at a minimum of cost to the patient, and to yield fully as good results as any of the other operations performed externally. The operation seldom needed to be as extensive as seemed to have been suggested by some of the speakers. It was quite possible to thoroughly cocaine the cavity and its walls, and to successfully treat the conditions usually found. Of course, it was understood that the discussion did not include the treatment of new growths of the antrum. Such cases would require radical means, far more severe than any called for in the ordinary cases of suppurative disease. In dealing with the latter, however, the speaker

regarded operation by the nasal route as on the whole the best. Speaking of improved instruments for this purpose, it was only necessary to compare the crude trochar and canula formerly used with the admirable drills exhibited by the reader of one of the papers of the evening to at once appreciate the great superiority from every point of view of the newer apparatus.

DR. CURTIS said that the inferior meatus operation could not be compared to the canine fossa operation as the scope of the operation was different. As a preliminary operation it was always to be advised. Even if septa or dentigerous cysts were discovered, the canine fossa operation could be performed afterwards, with drainage already established into the nose. The general surgeons who do the canine fossa operation exclusively are possibly not aware how many of their antrum cases find their way after reinfection to the rhinologists. The great trouble in the canine fossa operation is the premature healing of the mouth orifice and not the difficulty of making it heal. The moment the mouth orifice heals with no nasal drainage, that moment the antrum is liable to become reinfected. As regards the criticism of showing a large armamentarium for a slight operation, he thought when students and general practitioners were present, to be instructed by a discussion of this sort, that it was a very wise thing to show the canulas, forceps and other instrument required in the performance of the operation under debate.

In regard to the suggestion that better drainage was secured in the mouth operation, he would answer that drainage with oxygenation of the cavity by means of a large nasal fenestration was much superior in the results obtained.

As for the inferior meatus operation, he performed this with a mallet and curved gouge, which were all the instruments which were really necessary, except in trimming the edges afterward; but remembered being called into the country, and, relying upon the statement that everything that was necessary for a canine fossa operation would be provided, he had called for a retractor, and found that there was none, as it was not thought that it would be needed. One of the surgeons who had spoken had said that hemorrhage was something which need not be considered at all in the antral operation. He had had some experience with hemorrhages of the antrum cavity. There are some membranes which bleed like stuck pigs. He had had cases with tremendous hemorrhages from the nose and antrum and had been glad to get his finger in and control them.

In regard to the rough edges of the nasal wound which had been referred to, he had found it very easy with suitable spoons and sickle knives, even if the dental burr drill was not employed, to go around the orifice and make the edges of the wound so smooth that the most delicate gauze would not catch on any portion of it. The two methods of operation have nothing to do with each other, and should not be compared, for they do not aim at the same effect. They are intended for entirely different conditions. To sum up, he would simply remind the section that the inferior meatus operation should always precede the canine fossa route, for in a great majority of cases it had proved all sufficient.

DR. MYLES said that it was very difficult to take a series of one hundred cases and discuss each case relatively, and he thought that this should be considered. The cases must be met as we find them and not as we would like to have them. For year he had performed the operation through the canine fossa, and noticed some things which were very peculiar. He had tried curetting, and had then omitted it; and it soon occurred to him that what had been curetted was not a true granulation tissue, but was an oedematous mucosa; and when he relieved the cavity by freer ventilation and drainage, the mucosa returned to a normal condition. He had noticed that when the inferior meatal route was adopted, the cases did well without curettage. Then Luc's operation was introduced, which was an excellent operation in its way, but required too much surgery. He had a serious objection to curetting a mucosa, which only needs an opportunity to get well of itself. Dr. Myles said that he had never seen a dentist remove all the buccal mucosa from the alveolar process on account of a caries, even extensive caries beneath the gum, gives but little trouble so long as there is free discharge. Practically the same condition exists in the antrum, which creates a focus of infection, which cannot get out, which in turn forms a degenerative process, producing a septic condition. When one secures a large opening, nature usually relieves the condition.

In regard to the partitions in the antrum, he saw no necessity for removing them, for the mucosa will return to its normal state on these as well as on the other walls, provided one secures free drainage and ventilation. He packs the cavity to express out the oedematous material. He had seen very little hemorrhage from within the cavity. The hemorrhage is generally in proportion to the curettage and from the turbinal wound, but in order to prevent bleeding, he uses a moderate tamponage of the cavity for 48 hours, and then lets it alone.

As to the instruments required for the operations, some would be required for one case, and some for others, but take a dozen cases and one would probably find need for all that he had presented to-night. Some cases require small instruments, and others where the nostril is wide admit larger ones. One cannot provide the nostril he may desire, but must have instruments fitted to the different requirements.

It was unfortunate that the time was so limited for the discussion of so important a subject, but he thought that when one was considering a large number of cases about 10 per cent would perhaps require the Caldwell-Luc operation through the canine fossa—closing the wound in the mouth, and drainage through the nose, and that for the other 90 per cent the intra-nasal route would be the method of choice.

DR. ABRAHAM said that in a twelve-minute paper it was absolutely impossible to cover all the points of this subject, and that in speaking of the radical operation he had undertaken to describe the simplest one. He was perfectly familiar with the modern radical operation, as he has operated on several cases by this method. He agreed with Dr. Bodine that Dr. Lloyd had not confined his remarks to empyaema, the subject under discussion, but had spoken of tumors, etc., in the antrum, which the papers of the evening had not dealt with. He fully agreed with all that Dr. Bodine had said excepting on two points. The Doctor had said that the curetting of an antrum is not advisable. Dr. Abraham said that the case he had just shown met this point, and also some of the points which Dr. Douglass had made. This case had presented a bulging naso-antral wall so that it was impossible to see beyond it. The cause of the chronic pathological condition was a large polypus and a mass of smaller ones. The polyps were removed and the antrum was curetted gently, and the patient was discharged cured after three or four weeks of treatment through the inferior meatal route. In regard to the number of instruments, he would like to know if any surgeon could operate through the fossa without the use of a knife, artery and dressing forceps, mallet, chisel and retractors. He had presented practically only two instruments, and the scissors making three. Of course, such things as applicators and other accessories were required in the treatment. Some of the gentlemen had spoken of the Caldwell-Luc operation for simple empyaema of the antrum. If we are dealing simply with empyaema of the antrum, why is it necessary to do such a radical operation as the re-

removal of the external wall, plus the intra-nasal operation? Why perform a major operation when the condition can be relieved by the simpler minor operation? Nearly every antrum upon which he had operated he had curetted through the nose; he had also treated and cured caries; he seldom encountered necrosis. He had seen only three cases of caries and they were of dental origin, and in these the teeth were extracted and the case treated accordingly. As for septa in the antra, teeth in the antra, etc., these can all be detected through the nasal route. He differed with those who remove the anterior end of the turbinate, and himself removes only the lower border. It was remarkable how much can be seen when this is done. In regard to sloughing and rough edges, they do occur, but not necessarily if the proper technique is observed. When curetting the antrum he does it very, very lightly, and does not remove the mucous membrane—only the granulations, caries, etc.

NEW INSTRUMENTS.

A Blunt and a Cutting Laryngeal Dilator. By J. W. GLEITSMANN, M.D. (*Published in full in this issue of THE LARYNGOSCOPE, page 379.*)

DISCUSSION.

DR. DELAVAN spoke in terms of high commendation of the cutting dilator presented by Dr. Gleitsmann. He called attention to its great superiority over other dilators, of which, next to Dr. Gleitsmann's, McNeil Whistler's had been the best. Dr. Gleitsmann's instrument was easily manipulated and accurate and its action was under perfect control. The speaker had recently employed it, in company with Dr. John Rogers, in a case of stenosis of the larynx in a young woman in which the obstruction was caused by a firm mass of cicatricial tissue which united the vocal band throughout their anterior half, and extended for three-quarters of an inch below the glottis. With Dr. Gleitsmann's instrument, division of this mass had been easily accomplished.

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY.

Regular Meeting, March 19, 1907.

J. HOLINGER, M. D., President.

PRESENTATION OF CASES.

Case of Exfoliation of Os Tympanicum. By F. G. STUBBS, M.D.

This young man, James R., aged twenty, has an hereditary crumpling of the auricle with a supernumerary tragus. The auditory canal has always been extremely narrow and accounts for the course of the disease. While the hearing in that ear had never been acute, yet he had never had any inflammation previous to this attack. About the middle of October, on returning from work, he was taken with a sharp pain in this ear, which continued all night and kept him from going to work the following day. That evening the pain eased up and he soon noticed what he thought was a moisture from an increased amount of ear wax. The following morning there began to appear a swelling behind the ear and some paralysis of the same side of his face. The next morning, fourth day, he came to my office, when I saw him for the first time. I found complete facial paralysis, a boggy swelling behind and somewhat below the ear, the canal completely closed, and, from it I could see a slight discharge of muco-pus exuding. The same afternoon I operated, making the usual incision as for a simple mastoid, but prolonging the incision farther down than usual. I found pus outside the tip, and on enlarging the incision soon got into an abscess cavity below and anterior to the tip. In this cavity I found the facial nerve and so I cautiously mopped it out in order to avoid wounding the nerve. Believing I had a Bezold's abscess to deal with, I proceeded to open the cells. I found them normal; but, at the same time, I found the os tympanum free from all attachments and removed it entire. The inner third of the soft parts of the canal, together with the middle ear cavity, was necrotic and had to be curetted, so that I had a condition somewhat similar to part of a radical mastoid operation, except that the attic wall and antrum were not disturbed. In two months the wounds were healed, and I do not think the external canal is any narrower than it was before the operation. The secretion has now ceased and hearing is about half of normal.

I did nothing for the facial paralysis, as it is shown by experience that where the integrity of the nerve is not injured the usual course is to complete restitution of function. As you see, the results are perfect, but it is only in the last few weeks that it is so.

I am unable to find, as far as I have gone in the literature, a report of this exact condition of affairs. In young children, this part of the temporal bone is not uncommonly cast off as a sequestrum, for at that age it is not attached to the other parts of the temporal by bony union. In the adult, it is not rare in syphilitic necrosis, to find that all or part of the os tympanum is cast off as a sequestrum. But in this case it was entirely dissected loose by virtue of the fact that the pus was held back by the narrow canal and thus forced down through the suture attaching this part to the squamous and petrous portions. The abscess forming below this and the tip of the mastoid and thus early causing the facial paralysis.

It is well to bear in mind the formation of this portion of the temporal in its embryonal formation and to remember that this suture is frequently only loosely formed of connective tissue, that the blood-vessels pass through it and enter the cells of the mastoid and hence form an atrium for the infection in the mastoid to pass out and point below the tip of the mastoid.

A Case of Rhino-Scleroma. By F. G. STUBBS, M.D.

This patient, Mary G., aged twenty-one, is a native of Austrian Poland. She has been in this country four years. Previous to this time has never been sick, and first complained of this trouble some time after coming to New York, where she first lived. Then she was told that she had only some slight catarrhal affection. Her symptom was an increased nasal secretion. For the space of a few months before coming to Chicago, five months ago, she began to have a slight cough and a peculiar huskiness to the voice.

This increased so that the breathing was as loud as that of a patient with croup, and could be heard in the next room.

She was referred to me six weeks or so ago by Dr. Hedger, and I found the following conditions: The lower turbinates on both sides were enlarged in their posterior thirds, larger on the right, firm to touch and of a grayish color. The lower edges of the choanæ were thickened, as was the neighboring edges of the septum. The pharynx showed no invasion of the process. On looking into the larynx, I found the cords unaffected, but the rima glottidis gave

the appearance of looking into a cavern. This was due to a sub-glottic swelling covered with mucus and blackened with Chicago soot. It was difficult to make out any chink at all through which air could pass. I succeeded in passing a No. 2 Schroetter dilator and continued this every other day, at first, till now I have been passing it only once a week. This has relieved her of all dyspnoea and reduced the cough. During the time she has been under my observation there has been a perceptible increase in the size of the swellings already present and an additional one on the base of the tongue.

I excised a piece of tissue from the lower turbinate and at the same time had cultures taken from the secretion which was free in the nasal passages. The latter showed almost pure cultures of the Rhinoscleroma bacillus and it was found in the tissue as well. The tissue also showed the typical pathological conditions, including the "Mikulicz cells."

In view of the hitherto unsatisfactory results of treatment I had not taken up any definite procedure aside from keeping the sub-glottic space open for easy breathing. Recently there have been a few cases reported in Europe and New York in which it seems evident that the X-ray has acted as a specific, so to speak. Of the two cases reported from New York, I saw one last spring with Dr. Ballin at the Mt. Sinai Hospital. This case was affected only in the nose and externally, but is reported as cured. It is to be hoped that a remedy has been found, for the condition was almost hopeless up to now. Although the disease is not fatal unless it attacks the lower trachea and bronchial tubes, yet it is a serious form of rhinitis and more to be shunned than atrophic rhinitis.

The importance of presenting this case to you tonight lies alone not in its rarity and hence in being an "interesting case," but in drawing our attention to the fact that while there are not a score of these cases reported in this country there is no reason why they will not become more numerous as our unrestricted immigration allows more of these cases to come amongst us. The disease is on the increase in Europe, and on account of its infectious nature governmental measures have been talked of in eastern Prussia to deal with it as with leprosy.

Dr. Reichman has offered to use the X-rays on this case, and I will present it again so you can see whatever progress is being made. While it is not difficult to apply the rays to the nose, it may be more difficult to reach the interior of the larynx. We hope to

obtain therapeutic results by applying them over the larynx. If it does not prove active, then it is a question whether by the aid of tubes the rays can be applied through the mouth, or a laryngo-fissure may have to be done and the larynx kept open while the treatment is being carried on.

DISCUSSION.

DR. ELMER L. KENYON.—One important matter with reference to rhinoscleroma is the making of an early diagnosis. I doubt whether rhinoscleroma has ever been seen and diagnosed so early that the disease could be handled at the beginning. This is unfortunate, because the condition is a serious one. When it attacks the larynx, it must be considered as approaching carcinoma in seriousness. Dr. Stubbs' case is a late one, but there are appearances in the nose which possibly represent conditions which might be found at the beginning of the disease. I refer to the hypertrophy at the middle portion of the right lower turbinate. Laryngologists should be on the alert to become familiar with conditions which make possible an early diagnosis.

Concerning treatment, surgery, excepting in the direction of alleviation, has invariably failed. The tumor removed from the nose in the case I studied returned exceedingly rapidly, within a few weeks.

There is reason to believe that native Americans are susceptible to the disease, although it is fair to suppose that the infection has not been present in this country except as brought in. Some years ago a Buffalo physician reported a case occurring in a native American who had never been out of this country. However, in that instance, a microscopic diagnosis was not reported.

The patient I saw had drifted from physician to physician for five or six years without receiving a suggestion of a correct diagnosis. Recently I saw a case of carcinoma of the larynx which had gone through much the same experience. It seems to me desirable that when the opportunity arises something should be said in the way of impressing upon the general practitioners the importance of having an expert examination made where diagnosis is doubtful.

A Case of Idiopathic Abscess of the Nasal Septum. By J. HOLLINGER, M.D.

This little boy of five years traveled with his father across the country on a very cold winter day about a year ago. On returning

home, his father noticed a red swelling in both nostrils. Nasal breathing was impossible. When I saw him five weeks later the mucous membrane of the septum filled both nostrils. The condition has changed comparatively little since then. The swelling is reduced. There was complete absence of the cartilaginous septum from the beginning. Pus was discharged from the swelling in both nostrils, and from the right upper incisor, on pressure of the gums. The tooth was extracted. The mucous membrane of the septum was treated as in acute anterior rhinitis, but improvement was very slow. The bone below the apertura pyriformis became thickened and small spiculæ of bone were repeatedly exfoliated. I made an incision into the swelling, and at every treatment I evacuated a few drops of pus. During the last two weeks, that is, over a year after the beginning of the disease, the permanent incisor tooth erupted in an abnormal position from the anterior surface of the gum. The abscess is drying out very slowly. The triangular cartilages have disappeared.

A Case of Chronic Affection of the Eustachian Tube, 3 Schwartz,
1 Radical Operation, Pericartilaginitis, Cured Facial Paralysis. By J. HOLINGER, M.D.

Mr. N. was seen the first time in July, 1903, complaining of nearly the same symptoms as he does now, namely, headache, dizziness, running of the right ear, noise. The Eustachian catheter relieved all symptoms and the functional tests showed that there was no other change in the middle ear. A course of treatment with catheter improved the condition. He left the city. Soon all his ailments reappeared. I saw him again in the summer, 1905, when he had a large suppurating fistula behind his right ear, packed with iodoform gauze, and again he complained of dizziness and headache. He gave the following history: He was operated upon in the fall, 1905, in Chicago, and made a very slow recovery extending over three months. He was operated upon a second time about two months before I saw him in 1905. A large scar in the neck behind the sterno-cleido mastoid muscle dated from an abscess operated upon in 1903. He said that the depth of the wound was cauterized at regular intervals by his doctor and still the fistula would not close. I catheterized the tube every second day and the fistula closed after two weeks. He again left the city and reappeared at my office last June. He was previously operated upon for the third time in March, 1906. He complained again of head-

ache and dizziness. A course of treatment with the catheter relieved him temporarily, but he wanted to be cured permanently. I therefore proposed radical operation, which was performed in Alexian Brothers' Hospital. A large keloid in the old scar was removed. The bone was very hard and showed no cells. A fistulous tract began one centimeter below the outer plate above the antrum, and led to a whitish fibroid mass, round in shape and one and a half centimeters in diameter, which was not well outlined from the surroundings except from the tympanic cavity. This mass made me suspicious of carcinoma and was therefore completely removed, regardless of consequences. The posterior semi-circular canal was opened and the dura exposed to a large extent. The whole posterior bony wall of the meatus was removed, together with the incus. A "Y" shaped incision in the concha was made and suturing and packing through the wound in the concha was done in the usual manner. The specimen was lost, notwithstanding the extreme care that was recommended for its preservation.

The next day there was complete facial paralysis on that side.

He made a very slow recovery. The first dressing was changed five days after operation. Ten days after operation, swelling and pain in the auricle appeared. The dressings were changed every day. The auricle was exposed to sunlight for hours. A perichondritis ran its full course and left the auricle with a horizontal fold above the meatus. The epidermisation of the wound was very slow and took over eight months, five times as long as usual. The drum membrane regenerated to its full extent, and with it the old complaints of headache and dizziness reappeared.

The lack of any tendency of healing is shown in another fact. The wound behind the ear had healed by primary union, when several months after operation a suppuration started up from a part of the wound that was dry and epidermized for several weeks. It destroyed all support of the scar and left, after a long course, a deeply retracted funnel-shaped scar with a very narrow persistent opening, behind the ear, which I am going to leave untouched, as the slightest touch with a probe wound with cotton is liable to start a suppuration lasting for months.

The ear is dry at present. Now and then a small drop of pus forms in the outer excavation of the canal from under the outer scar. The paralysis of the facial nerve has disappeared, he closes the eye and moves the angle of his mouth.

The functional tests show: Hearing distance for whisper, right ear, 0; left ear, more than 5 in. Rinné test, right ear, + t; left ear, — 10. Lowest sound heard, right ear, 38 d.v.; left ear, A¹.

He comes three times a week for catheterisation.

The features of this case are: 1. Three Schwartze and one radical operation on account of symptoms due to occlusion of the Eustachian tube. 2. Complete paralysis of the facial nerve. cured. 3. Extremely poor tendency of healing of the soft parts and the bone. 4. Pericartilaginitis of the auricle cured with scar. 5. Persistence of the original symptoms, headache, dizziness, subjective noise, which are all relieved after catheterisation. The discharge has ceased.

This latest point involves theoretical questions: How can those symptoms be explained in view of absence of the incus? Suction on the stirrup?

DISCUSSION.

DR. J. C. BECK: I would like to ask Dr. Holinger why he called the first case one of idiopathic abscess. Supernumerary teeth and alveolar abscesses frequently burrow along the septum, thus causing the condition seen in this case. The appearance of sequestra and pus and the later eruption of the tooth show that such a condition may have existed. I have a similar case under observation. Leaving the cavity alone pus shows an extension along the floor of the nose toward the septum, and on opening the cavity pus exudes and the boggiess and swelling in the nose disappear. A radiograph may show more than one tooth, and I would suggest that Dr. Holinger have one made. It may suggest a cause for the condition.

In regard to the second case, it is nice to see so many cases that get well without operative interference, but I think you will find that the continuity of the facial nerve was not destroyed entirely. Inflammatory conditions will produce facial nerve paralysis, and when this subsides the nerve regains its function.

With regard to the use of X-ray tubes in the mouth, that is impossible, because we cannot get a bulb that is small enough to throw a direct ray on the larynx, and the ray cannot be deflected; but it can be passed through the neck.

DR. HOLINGER (closing the discussion): The tooth did not appear until about two weeks ago. Before that it looked like a callus. I think the abnormality of the tooth is rather effect than cause of the suppuration, because a thickening of the bone began to develop

only eight months after the tooth was pulled, and even now the abnormal tooth is far ahead in development of all other teeth, owing to the early extraction of the milk tooth.

Case of Laryngeal Neoplasm. By OTTO J. STEIN, M.D.

The patient is a man forty-eight years old, a coal dealer, who has always been healthy. No history of venereal disease. His father is still living; his mother died at the age of sixty, of some heart affection. The family and personal history is absolutely negative. The present trouble was first noticed as a hoarseness less than four months ago. It came on gradually, but finally got so bad that he consulted a physician, who treated him expectantly. He has lost about ten pounds in weight in six months. His appetite is good; temperature is normal. Examination of the chest disclosed an emphysema of no great moment. The sputum was negative. The man had a severe pharyngitis when first seen, but that has disappeared.

On examining the larynx, nothing is seen above the cords, but below the right cord there is visible a tumor that is attached to the lateral wall of the larynx. The cord is quite red, thickened, and almost immovable. At the edges it is slightly ragged. The left cord is normal. There is fair compensation and approximation is very good. The tumor has a yellowish-pink color, suggesting a papilloma or granulation tissue. On palpation there can be felt slight enlargement of the glands of the neck, but palpation of the larynx shows no marked thickening on the right side. Evidently the mass takes its origin deep in the tissues of the larynx. Microscopic examination of the tumor mass showed granulation tissue. The history and laryngeal picture indicate a malignancy. If this is the correct diagnosis, it is imperative to operate radically and without loss of time, in order to secure the most favorable prognosis.

DISCUSSION.

DR. E. FLETCHER INGALS: The history of this case is so typical of malignancy that it seems that there is no chance of its being anything else. There are only three things that it might be—syphilis, tuberculosis, or carcinoma. From the history, I would say carcinoma. The cases of subglottic tumors that I have seen do not show up very much, even though they involve considerable tissue, and prevent the movement of the cord. I have not yet seen any that could be successfully removed in any other way than by a laryngec-

tomy, for the reason that although the growth may have appeared small on laryngoscopy, it was shown at the operation to have passed beyond the median line a considerable distance.

Embryonic Preparations. By G. W. BOOT, M.D.

DR. G. W. BOOT gave a demonstration of preparations of sections of the human embryo, showing the development of the nose, antrum, sinuses, and portions of the middle ear.

Demonstration of Probable Angioma Removed from External Auditory Meatus. By GEO. E. SHAMBAUGH, M.D.

You will remember that about a year ago I exhibited before this society a patient who had vicarious menstruation from the ear, the bleeding taking place from a swelling on the upper anterior wall near the external part of the meatus. The growth filled about two-thirds of the meatus, and terminated in a nipple-like projection. A crystal of chromic acid checked the bleeding, but the swelling was the source of a great deal of annoyance. The tumor was removed six months ago, and there has been no evidence of recurrence. At the menstrual period, the ear previous to the removal would become red and annoy the patient very much for a week. The tumor bled freely at its removal. It shows a very greatly thickened skin; the deeper structures are very vascular. The tissue resembles the erectile tissues of the turbinated bodies. The tumor is evidently a form of angioma.

**JOINT MEETING OF THE CHICAGO LARYNGOLOGICAL AND
OTOLOGICAL SOCIETY AND CHICAGO MEDICAL SOCIETY.**

Joint Meeting, March 20, 1907.

DR. J. HOLINGER, M. D., President of the Chicago Laryngological and Otological Society, in the chair.

Papers were read as follows:

Relation between Diseases of the Faucial Tonsil and Rheumatism

By E. FLETCHER INGALS, M.D. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)

The Relation between Diseases of the Faucial Tonsils and Enlargement of the Glands of the Neck. By JAMES T. CAMPBELL, M.D.

Discussion of the Occurrence of Tubercular Disease of the Tonsils

By CHARLES M. ROBERTSON, M.D. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)

JOINT DISCUSSION.

DR. JOSEPH A. CAPPS—In the absence of Dr. Herrick, who was to have opened the discussion on Dr. Campbell's paper, I was asked to take part in the discussion on the relation of inflammation of the throat to inflammation of the lymphatic glands. Dr. Campbell has already covered the association of inflammation of the throat and glands so thoroughly that I will only speak of one group of cases, to which he did not pay any special attention, since his paper was so broad in scope. I refer to the type of cases with acute cervical adenitis that occurs especially in children, and with a simple sore throat. When I say simple sore throat, I say it purposely, because its etiology is not definitely settled. It is a type of sore throat, however, we would ordinarily call a grip sore throat, and this combination of sore throat and adenitis is especially interesting, and important just now for two reasons: First, the combination has in the last year been more prevalent than usual; and, second, some new light has been thrown upon the etiology of these infections. Perhaps, etiologically, this is not a distinct group, but clinically it is, and I think it would be well to point out some of the characteristics

of this class of cases. The clinical picture I refer to is this: A child has sore throat, high temperature, and a correspondingly rapid pulse. On examination, the throat is seen to be neither ulcerated, nor is there any follicular tonsillitis, such as we might have anticipated from the symptoms, but simply a red, congested throat. The soft palate, the tonsils, pharynx, and naso-pharynx, take part in this redness equally. The temperature remains high for several days. The infection is more severe than one would expect from the first examination; then gradually the temperature subsides. Perhaps there has been a slight glandular swelling, but not pronounced, when an exacerbation of the symptoms comes on. The fever rises usually to 104 to 105 degrees, the pulse is rapid again, the child seems quite as ill or more so than at the first visit, and there is noticeable a very decided swelling of the cervical glands, particularly near the angle of the jaw, involving the deep cervical glands. This enlargement of the glands, at first discrete, is very apt to become diffuse, and is very rapid in its progress until the lump may become the size of a hen's egg or the size of the fist, and usually it is quite hard and tender, rather irregular in outline, and, as I said before, it is apt to become diffuse, so that we cannot make out definitely the individual glands. This tumor mass, made up of inflamed glands, may remain without much change; the temperature continuing for a week or two weeks, possibly longer, when it follows one of two courses: It either begins to subside, and when once it begins to subside the improvement is rapid, or else the case goes on to suppuration. A red spot appears at some point, and either ruptures spontaneously or is opened, and a small quantity of pus is evacuated. Usually the whole group of glands does not suppurate, only a portion of them. I presume that this clinical picture has been more common in the last year or two, not because it is anything new, but because all infections of the throat have been so prevalent this last year.

In looking up my records, I find that in the last two years I have seen five cases which would fairly come within this group. Of that number, in four, cultures were taken from the throat, and in all four, influenza bacilli were found in considerable number; but the smear did not show a pure infection by any means. There were present also streptococci or staphylococci. Two cases progressed to suppuration, and the pus from them both showed streptococci in large numbers.

The etiology, as I said before, is not clear. The fact that grippé organisms were so often found in this group led me to make some inquiries among physicians with regard to these cases, and I learn that in many similar cases seen by other physicians, influenzal infection forms a basis of the whole picture, and it recalls the so-called glandular fever which Pfeiffer described. Possibly it is similar to the enlargement of the glands he described, and which he attributed to the influenza bacillus; but whether he found the influenza bacilli in the glands or not, I do not know. The fact that in the two suppurated cases streptococci were found would suggest that the glandular swellings which break down are probably due to mixed infection. We might assume that we have grippé infection in a large proportion of these cases; that pyogenic cocci are present in some, possibly in all, and that these cocci are responsible for breaking-down of the glands. I think it quite probable that the large gland tumors which do not suppurate are also due to the pus organisms, for we do not see in ordinary cases of influenza any marked predisposition to glandular enlargement.

The diagnosis of these cases is not at all difficult. An important thing in my experience is the great size of the enlargement, the height of the fever, and the constitutional symptoms. There is nearly always a leucocytosis of 15,000 to 20,000, and the appearance is quite alarming unless one has seen the same picture before.

These cases may be confounded with acute tuberculosis. In fact, Dr. Eisendrath, in a recent article, described two cases of a similar type clinically upon which he operated, and which he considered from the nature of the cheesy pus were tuberculous. It is certainly a very unusual form of tuberculosis. But the cases I have described in this general type can usually be readily distinguished from tuberculosis by the sudden appearance of glandular swelling, and even more by the rapid disappearance of the swelling. In some of these cases there may be a lump left in the neck for several months, but in the course of five or six or eight weeks, as a rule, nothing remains to tell the story. We could hardly conceive of a tuberculosis disappearing so quickly and so completely.

I think it would be profitable if cultures were more generally made in these cases, in order that an etiological classification might be made.

DR. DANIEL N. EISENDRATH—This is a subject that interests the general surgeon almost as much as it does the specialist in nose and throat work, and it is one I have been particularly interested in for

a number of years, and have kept accounts of the cases I have seen. The cases to which Dr. Capps referred are especially interesting. This winter they have not been as prevalent—at least, I have not seen as many as I did last winter. These cases were what Dr. Capps has called acute enlargement of the lymph nodes of the neck, and probably correspond to some extent with those described by Pfeiffer in 1899 as glandular fever. In the cases which I saw the enlargement of the lymph nodes was out of proportion to the height of the temperature. Very frequently I was called to see these cases in consultation. A child, for instance, would have a temperature of 104 or 105 degrees, with a relatively small number of lymph nodes enlarged, not larger perhaps than the average sized marble. During the present winter, these cases have assumed a little different type in that not only have they affected the lymph nodes of the neck, following primary sore throat, but they have affected other lymph nodes, as those of the axilla, the groin, apparently taking part in the process of a general infection, so that in some cases it was thought there was an acute lymphatic leukemia until the blood was examined.

The case which Dr. Capps referred to is one I reported last winter. This was especially interesting. The patient was a boy, 14 years of age, attending high school, who had been treated by his physician for grip and enlargement of the glands of the neck. Following this treatment, his temperature apparently became normal. I saw him three or four weeks after the enlargement had begun. On account of a swelling existing in the sternocleido-mastoid muscle, and finding distinct fluctuation, I excised what I considered to be a typical tuberculous broken-down gland that continued to suppurate for about two weeks longer, and I did a radical operation, extirpating about twenty typical tuberculous glands in all stages, from the little tubercle to the large broken-down cheesy gland. Undoubtedly this was a case of mixed infection, where the Pfeiffer bacillus infection was, in all probability, the primary cause of the trouble, with secondary infection with tuberculosis. It is of especial interest because these cases are apt to be overlooked and are considered to be ordinary glandular fever.

A number of very interesting points have been brought out. Unfortunately, I did not hear the paper of Dr. Ingals; I simply heard Dr. Robertson's reference to it. Dr. Robertson, in quoting Dr. Ingals, said there were no cases of primary tuberculosis of the tonsil, if I understood him correctly. I have had occasion to look up the

literature quite thoroughly, and the first question that arises is this: What can be considered primary tuberculosis of the tonsil? The most rigid test of primary tuberculosis of the tonsil would be that at autopsy you can find no other focus of tuberculosis in the body. But that is usually impossible, and we must depend upon the clinical findings, as in tuberculosis of the lungs or intestines, and from our observation of the patient.

There have been reported eleven undoubted cases of primary tuberculosis of the tonsil, the majority of them having been verified by autopsies and of finding primary tuberculosis of the tonsil, in which there were no other tubercle bacilli found in the body. The primary focus being in the tonsil, with secondary involvement of the lymph nodes of the neck.

Dr. Robertson referred to some researches that have been made by Luder, who found in 32 cases only 5 of tuberculosis in extirpated tonsils. It is a hard problem to decide whether there is in these cases primary tuberculosis of the tonsil or not. In about sixty cases of operations for tuberculosis of the lymph nodes of the neck, I have made it a rule to have associated with myself a laryngologist and rhinologist for the purpose of extirpating the tonsils. It is a fact not known generally by the average surgeon or general practitioner that tubercular lymph nodes of the neck will cease to develop in the majority of cases if we remove the primary focus, which, so far as we can tell, is in the tonsil. I have seen that verified clinically in two cases. One patient was a boy, ten years of age, upon whom I operated for the removal of tubercular glands of the neck. I removed a large number of them, and at the end of six months he came back with as large a crop as before. I took out a second lot of these tubercular glands or nodes, and had a specialist remove the tonsils and adenoids. Since that time there has been absolutely no recurrence. I had the same experience in a second case.

I wish to emphasize the point that in every case, where a surgeon operates upon tubercular glands of the neck, he ought to have the tonsils and adenoids removed, because the percentage of tubercular tonsils and adenoids, as researches show, varies from eight to ten or twelve per cent., so that we cannot afford to take any chances in leaving them.

As to the relation between appendicitis and tonsillitis, scarcely a winter has passed during the last two or three years that surgeons have not seen tonsillitis in children followed by typical attacks of ap-

pendicitis, so that clinically the association of the two diseases is quite well established.

DR. ROBERT H. BABCOCK—I have not heard a discussion in this hall for a long time which I regard of so much importance to the general practitioner as the one to which we have listened this evening. Perhaps in this connection, I might cite a remark made by the late Dr. Christopher in his last illness to the effect that, in thinking over his work among children, he was impressed by the fact that in nearly every instance of disease in children, of whatever nature, the portal of infection had been the throat, and that in a very large percentage of cases the portal of entrance had been the tonsil. This is a matter which I feel the general practitioner is not always sufficiently alive to; certainly, the cases of adults that come to me, as well as of children, bear out the importance of the condition of the tonsils. A large majority of the cases I see are instances with some form of heart disease, perhaps valvular disease, and nearly all the cases which I have investigated, since my attention was drawn to the subject a good many years ago by the researches of Fritz Meyer, have shown either chronically diseased tonsils, or a history of previous sore throat, using it in a general sense, and many times a tonsillitis.

I do not know whether Dr. Ingals referred to the work done by Fritz Meyer in the effort to determine the bacteria responsible for acute articular rheumatism, or not. The question is still *sub judice*; but I believe the trend of investigation and thought is to the effect that we must abandon our old notion that acute articular rheumatism is a blood disease in the sense of its being due to some chemical irritant; that it is, in fact, a specific disease. There have been a great many observations made which go far to prove, although they are not accepted by all, that the micro-organism responsible for attacks of acute articular rheumatism of the typical or classical type is a diplococcus allied to the streptococcus, and which has been styled the diplococcus rheumaticus.

We must recognize various kinds of articular rheumatism, some of which seem to be of a specific type, and others of which are due to streptococcus infection apparently, but are not specific.

With reference to the importance played by follicular tonsillitis in the production of acute endocarditis, I would like to cite the instance of a young man in this city who, in April, two years ago, developed an acute tonsillitis which he thought but little of, which was treated by his physician, and subsided to all appearances in a

few days. He did not, however, regain his health fully, and in the latter part of June developed symptoms which, at first, were obscure and thought to be those of typhoid fever. The disease proved to be a streptococcus infection with malignant endocarditis, pure streptococci being obtained from the blood. The disease progressed in spite of everything until he died in the following December, and the autopsy substantiated the diagnosis which had been made during life. In this case it was clear as daylight that infection started in the tonsil; that it was apparently a trifling tonsillitis, and yet it resulted in this man's death six months later.

With reference to tuberculosis of the tonsil, I would only like to say that statistics are at variance as to the frequency of primary, as well as secondary, tuberculosis of the tonsil; but that tuberculosis of the tonsil does take place, there can be no doubt, and that diseased tonsils in childhood furnish a culture medium for the development of such bacilli as may be inhaled, is beyond all cavil, and therefore the tonsils may furnish a portal of infection which may ultimately result in pulmonary tuberculosis in adult age. Therefore, I am radical in my opinion and advice to parents, to have the tonsils of their children removed.

DR. FRANK S. CHURCHILL.—This is a subject which interests the pediatrician fully as much as it does the laryngologist. I would like to emphasize especially what Dr. Babcock has just said with reference to the importance of the removal of enlarged tonsils and adenoids in children. A child with enlarged tonsils which are always in a diseased condition is exposed constantly to repeated infections, not only minor infections, such as those produced by the streptococcus and influenza bacillus, but the more serious infections, such as those produced by the Klebs-Loeffler bacillus, and scarlatinal infections. Such children are more apt to pick up these infections than if they are minus this disease of the tonsils. I always advocate and advise parents of patients to have these adenoids and enlarged tonsils removed.

There is one point to which I am afraid the laryngologists do not attach enough importance, for the simple reason that they do not see their patients afterwards as often as do the pediatricians. I am very much opposed to having the tonsils and adenoids of children removed in the fall and winter months of the year. I would have them removed, if possible, in the late spring or summer, on account of the climatic conditions under which we live, for I have seen repeatedly children from whom these gentlemen have removed

adenoids and tonsils in the fall of the year, having persistent "colds" throughout the following winter, having attacks of infections of an unknown and indefinite nature. So I think it is quite important that the tonsils should be removed during the warm season of the year.

The paper in which I am more particularly interested is the first, that of Dr. Ingals, on the relationship of tonsillitis to rheumatism. It seems to me Dr. Ingals takes too limited a view of the term "rheumatism." It is among children especially that we have the best opportunity for studying the manifestations of this disease, for at this period of life it is most varied in its forms. In children, we do not see an arthritis as the most common and frequent manifestation of rheumatism. We see, rather, endocarditis. Cheadle was one of the first, if not the first, to point out the broader conception of the term rheumatism. "Arthritis is at its minimum, endocarditis is at its maximum." Other manifestations of it are, in addition to tonsillitis and endocarditis, the subcutaneous enlargements which Cheadle and other Englishmen speak of frequently—erythema and pleurisy, and some English writers speak even of certain attacks of appendicitis as a manifestation of rheumatism, which is interesting, *apropos* of Dr. Eisendrath's remarks about the association of tonsillitis and appendicitis. Chorea is another manifestation of rheumatism very often, if not in all cases. These are not *complications*, but are *manifestations* of rheumatism, pure and simple, not always, but in a great many cases. Taking this broad conception of the term, it is obvious that if we go carefully into the histories of our cases, both before we see them and follow them up later on, we shall find more frequently in our cases of tonsillitis a history of antecedent rheumatism; that is, if we inquire whether or not the child has had any one or all of those different things—chorea, tonsillitis, endocarditis, erythema, pleurisy, etc. In children we must be prepared to see these wider manifestations of the disease. Furthermore, these manifestations often cover long periods of time, stretching not only into weeks and months, but maybe into years. They are apt to occur in children with a rheumatic family history; they occur in children who have attack of tonsillitis at one time; at another time an attack of endocarditis, and still another time an attack of erythema, or the development of subcutaneous nodules, etc.

Dr. Babcock spoke on the bacteriology and has quoted the work of Fritz Meyer, which is extremely interesting. After all, until

we find out more about the bacteriology of the subject, our views will be more or less theoretical, but as far as they go, of one thing there can be no doubt, and that is the general trend of opinion is to regard rheumatism as an infectious disease; and the researches of Fritz Meyer go to confirm that view. The cause is perhaps the diplococcus of which Meyer has spoken, and which he has found on the tonsils of rheumatic individuals when he has failed to find it in the blood or in other parts of the body. He has also found it in the subcutaneous fibrous nodules, of which apparently the English see more than we do in America, bearing out the theory that these are also of an infectious nature and are a manifestation of rheumatism.

Dr. Campbell said that breast-fed infants are more immune to infectious diseases than are other individuals, if I understood him correctly. That is true, but whether or not it is due to the absence of the tonsil, as he also stated, I am rather skeptical. The immunity does not apply to bottle-fed babies, equally without tonsils. In this connection, it is interesting to refer to the work of Amberg, of Baltimore, who has tested the opsonic index (to staphylococcus) of breast-fed babies and also of bottle-fed babies, and has found that, as a rule, the index of breast-fed babies runs higher than does the index of bottle-fed babies, showing, I presume, a greater resistance on the part of such babies to infectious diseases.

DR. ELMER L. KENYON.—It seems to me that the specially significant idea involved in the series of papers read tonight is the attempt to substitute facts for what has heretofore been largely speculation. The whole question is one which concerns the relationship of conditions in the upper air and food passages to remote infections. If one searches the literature, he will find a good deal of supposition concerning such a relationship, and he will find a real absence of proof. It seems fortunate now that we have entered upon a course which promises to result in the accumulation of facts. But the proof of this relationship is certainly difficult. If it were true that remote infection usually followed at once upon an acute infection of the throat, then the establishment of the association would be easier. As a matter of fact, I believe the rule is that remote infection has no immediate reference as to time with local inflammation. A number of cases have been cited here tonight in which such a relationship has seemed to be immediate. In the effort to accumulate the facts in connection with these cases, it is highly desirable that every instance of apparent certainty in

the immediate association of throat inflammation with remote infection should be put into print, in order that an accumulation of proof may go on. On the whole, however, as I see it, for actual proof we will have to depend on statistics. This is unfortunate, because statistics are hard to manage.

Speaking of Dr. Ingals' tonsillitis cases, they are impressive; yet one would not be holding his mind open to scientific frankness if he did not realize the serious possibility of error in these statistics. Both in the tonsillitis cases and in the control cases, the patients may have been, and indeed to a large extent were, subject to such diseases as tuberculosis of the lungs, pneumonia, bronchitis, syphilis, asthma, hay fever, other inflammations of the throat and nose beside tonsillitis, and to various digestive disturbances, any one of which might have served to produce an atrium for the entrance of the rheumatic infection, because any mucous membrane connected with the outer air is certainly capable of bearing infective germs. So there is a real possibility of error here, and these statistics cannot but be viewed in the light of such possibility. Much more evidence must be adduced in order to prove the relationship of acute tonsillitis to rheumatism.

Cases of adenoids, I think, would be peculiarly favorable for such statistical study. The reason is that a series of cases of adenoids (including also faucial tonsil enlargement) might be found in children in which practically no other disease had been present, or was present, affecting either the skin or mucous membranes. A control series of cases in which children practically free of diseases either of the skin or of the mucous surfaces connected with the outer air, could also be secured. Such cases would be favorable for statistical study in this connection, because less liable to error from other incidental diseases of the mucous membranes.

Realizing that the mucous membrane of the pharynx as well as the lymphatic tissue of the tonsils might constitute an important source of haematogenic infection from the throat, I set out to attempt to formulate a series of statistical cases. I took out of Dr. Ingals' large store 278 records of cases of pharyngitis and rhinitis; I included very carefully only those cases in which the tonsils were clearly stated to be normal. I excluded all cases in which the patient had had any disease whatsoever, excepting the early diseases of childhood; the only exception to this was that one or two cases of inflammation of the ear were included. Out of these 27 cases, there were seven instances of rheumatism of one form or another,

that is 26½%. While this small list of cases can mean nothing accurate of itself, yet it tends to confirm the possibility of error in Dr. Ingals' statistics, and to prove that rheumatic infection may enter through inflamed mucous membrane. It is possible that pharyngeal inflammation is nearly or even quite as important as tonsillar inflammation in its liability to be the source of haematogenic infection.

DR. WILLIM L. BALLENGER.—The trend of opinion is that the tonsils are a course of infection not only for tuberculosis, but for rheumatism and many other diseases, and, being a source of infection, the question naturally arises, What can be done to prevent the absorption of infective material? In other words, shall we be content with the partial removal of the tonsils, or a complete removal of them?

Dr. Robertson found in his tubercular cases lesions at the bottom of the crypts. He said, also, that he found the crypts very often extended to the tonsillar capsule, the outer wall. I have removed many hundreds of tonsils with the capsule intact; and I have examined every one of them with a probe, and I have found few instances in which the crypts did not extend to or very near to the capsule. It is rare, indeed, that a crypt does not extend to the capsule or the entire depth of the tonsil. If we want to remove the source of infection, the atrium of infection in these cases, we should therefore remove the tonsil to the depth of the crypts, and the easiest and most certain way to do it is to remove the tonsil with its capsule intact.

As to the advisability of operating in the fall or winter, or of waiting for late spring or summer, Dr. Churchill has said he found in many cases that the children had fever or were subject to colds for some months after operation when the operations were done in the fall and winter. The explanation of that may lie in the fact that the tonsils or adenoids were not completely removed. The atrium of infection, the crypts, still being left in the sinus tonsillaris. However, I am not sure that this is the true explanation. If the tonsil is completely removed, this source of danger may be reduced somewhat. Hence, in my opinion, the only operation that is justifiable is complete removal of the tonsil, not necessarily with its capsule intact, but so much of them as to include all the crypts, which practically reduces it to the point where we must remove the capsule. I admit that all the essential part of the tonsil can be removed, and still leave the capsule; a safer way, however, is to re-

move the capsule as well. I can conceive of no serious argument against it, and by so doing we are absolutely sure we have removed the tonsil with its crypts in its entirety. Hence, I would leave this suggestion with you, that we should thoroughly remove all the tonsil instead of partially removing it.

One of the great surgeons of America recently said: "The tonsil causes more sickness, suffering and death than the appendix." This being true, the technique of the tonsil operation is worthy of the most careful and painstaking study. The time must come, and is speedily coming, when the partial removal of the tonsil will be regarded, in most instances, as reprehensible practice.

DR. INGALS (closing the discussion on his part).—I feel more convinced of the fact than ever that our impressions are not of much value. A good deal that has been said this evening is possibly the result of impression. I admitted in the beginning that my impressions had been wrong, and I question whether some of the impressions of others may not be found faulty. I had become impressed with the idea that rheumatism and tonsillitis had either no relation or only a slight relation to each other; but an examination of my records showed that there was a good deal more relationship than I thought, and it is possible that some of the impressions that others have had quite firmly fixed will be found to be based on no better evidence than were my own. It has seemed to me that there is very much chance for error in the subject we have been discussing, and in the meaning of the term rheumatism. I do not think we are capable of saying what rheumatism is. I should suppose, however, that the gentlemen who treat children are more apt to be right than those of us who treat adults, in making an accurate diagnosis of rheumatism and in finding true rheumatic cases. It is possibly true that the various conditions that are called rheumatic do not depend upon a single infectious agent, or whatever its cause may be; whether it be a micro-organism or a chemical substance, and it appears likely that there is more than one agent or factor that causes the various actions that we call rheumatism.

I was quite surprised by the statement made by one gentleman that there was such a large number of primary cases of tuberculosis of the tonsils. It surely does not accord with my own observations; therefore, I was somewhat relieved when Dr. Eisendrath said there were only eleven such cases reported. I knew that I had never seen a case that I was sure was primary tuberculosis of the tonsils; but if there are only eleven cases that have been observed

anywhere, I do not wonder at my not having seen one. Years ago I thought that I had for treatment a patient with primary tuberculosis of the tonsil, but later I came to the conclusion that I had been mistaken in my diagnosis. The patient did not die of tuberculosis.

The suggestion that diseased tonsils ought to be removed is very pertinent, provided they are of any considerable size. I have felt that as long as a tonsil is not larger than an almond, and showed no active disease, and so long as it does not give the person any inconvenience by becoming inflamed from time to time, we are not justified in recommending its removal. But I do think, whenever a patient has a diseased tonsil, that has attained any considerable size, it certainly ought to be removed.

As to the time for the removal of the tonsils, I have not observed any of the indications Dr. Churchill spoke of. He may be correct, and I must confess that I have not seen patients very often after removing their tonsils. Generally, after removing tonsils from children, I see them in a couple of weeks, and perhaps do not see them again during their lifetime, or, if I do see them again, it is for some other trouble. I stated in my paper that in the 100 cases there was only one child under ten years of age in whom I found tonsillitis. I am not sure whether that was an acute tonsillitis or not, but I believe it was. Considering the fact that I have removed tonsils from hundreds of children, it is surprising that I have only one case of acute tonsillitis in a young child, although I have the records of all the cases that I have treated for over thirty years.

DR. ROBERTSON (closing the discussion).—There have been more than eleven cases of primary tuberculosis of the tonsil reported up to the present time. Dr. Ingals made a mistake; it is not that there were not more, but that there were only eleven cases found post-mortem where there was not tuberculosis found in other parts of the body, as pointed out by Dr. Eisendrath. It depends a good deal upon what we call primary tuberculosis. To say that we have primary tuberculosis would indicate that we are unable to find any trace of tuberculosis in any other part of the body, and that we can demonstrate this disease in the tonsil by the microscopic slide after the gland has been removed. That is as near as we can tell primary tuberculosis without a post-mortem. If we have a slide showing a broken-down lymph body that shows giant cells and epithelioid tissue, it is evidence enough that we have tubercular disease. Of course, there are lots of tonsils which may break down and

show giant cells which are not tubercular as in syphilis or chronic granulations.

Secondary tuberculosis will manifest itself as an ulceration of the tonsil.

As regards the size of the tonsils to be removed. That phase of the subject was not touched upon, nor was the method of removal referred to in this paper.

I would like to say, however, that any tonsil that is perceptibly enlarged is pathologic and should be removed.

There is no more reason why we should keep a diseased tonsil in the throat than a diseased appendix in the abdomen, and if any surgeon should diagnose appendicitis in these days and leave the appendix in the abdominal cavity, he would be mobbed. (Laughter.)

Other infections were not touched upon. There are infections which occur by way of the tonsils, and it is absolutely proven in my mind that the tonsil is the first place to be infected, because we can watch the glands beginning to be infected gradually; then we cut the tonsil out and see the infection disappear in a retrograde fashion, showing that the tonsil is the focus of infection. As Dr. Eisen-drath has remarked, in removing the glands of the neck it is necessary to remove the tonsil also.

The relation between the two is established and recognized by surgeons.

ERRATUM.

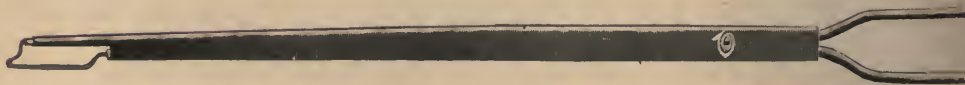


Fig. 4. Nasal Cautery Electrode. (Full size.)

This illustration should be substituted for the one on page 205 of *THE LARYNGOSCOPE*, March, 1907.

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ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding
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THE MOUTH OF THE ESOPHAGUS.*

BY PROF. GUSTAV KILLIAN, FREIBURG-I-BR.

The title of my paper may be received with some surprise. Has the esophagus a mouth? It will give me pleasure to present some data as the results of my recent careful research in the details of this question.

When the finger is introduced into the mouth of an adult, we reach at best the entrance of the larynx; and it is hardly possible to come to satisfactory conclusions concerning this matter. It is always difficult even for the experienced practitioner to introduce instruments into the esophagus back of the larynx. Practice is required to pass this point with ease.

Those who base their information on anatomical illustrations or on observations made on the cadaver cannot understand why it is so difficult to pass beyond the larynx into the esophagus, for in the cadaver no obstructions are apparent, and anatomists delineate this passage as they have studied it in the cadaver,—wide open.

More positive information may be gleaned by examination with the laryngoscope. To the inexperienced observer, the image presented in the laryngoscopic mirror does not indicate the position of the passage of the esophagus. This is corroborated by the queer answers given sometimes by students to questions concerning this point. Perhaps much of this confusion is due to the inversion of the picture of the larynx in the mirror, as the epiglottis is seen superiorly when in reality it is located anteriorly, and the arytenoid

* Read before the German Medical Society of the City of New York, June, 1907.

area is seen below when in reality it marks the posterior boundary of the glottis. According to this, it cannot be difficult to find the passage into the depth of the esophagus; as viewed in a laryngoscopic picture it must be situated below the posterior wall of the larynx, and may be diagrammatically represented by a single line. From this we may conclude that in the living subject the larynx lies close to the anterior surface of the spinal column, and that the passage to the esophagus is closed while at rest, that is, when not in the act of deglutition.

If we direct the patient to sustain a tone during examination with the laryngoscope, the course of the passage into the esophagus can be traced a little farther. During phonation the arytenoid cartilages are set in motion in a slightly forward direction, and are raised somewhat from the posterior wall of the pharynx. The movements of these cartilages are increased with the pitch of the tone. Thus an additional view of the depth of the trachea may be obtained, even to the upper border of the cricoid cartilage and laterally deep into the sinus pyriformis. This varies in different patients.

From the upper border of the cricoid cartilage, the passage appears tightly closed. It has been my impression, and possibly yours likewise, that this condition is due to the manner of suspension and fixation of the larynx by muscles and ligaments, while the muscles are completely inactive and in a state of rest, as in the cadaver. There is, however, a marked difference which first occurred to us when we attempted to pull the larynx forward from the vertebral column. In the cadaver this can be done easily when no muscle-rigidity exists. In the living subject, however, there is a marked resistance when the attempt is made. This can be easily proved on a lean neck by taking hold of the larynx in front and pulling it forward, or by pushing it forward with both hands from behind, or by grasping it with a forceps, taking hold in front, back of the cricoid cartilage. The resistance is enormous. The entire musculature in which the larynx is involved offers energetic though involuntary resistance. There exists, then, a tonicity of the muscles which maintains the larynx in its definite position and is only influenced by central impulses, as for example during deglutition, emesis, singing, etc., when changes in the position of the larynx take place.

I have observed in a number of cases that under special conditions a still deeper inspection may be made during phonation. If, during laryngoscopic examination, the patient is directed to bend the head well forward, and if the examiner views the larynx from below up-

wards, an additional stretch of the mucosa of the esophagus can sometimes be seen, corresponding to the upper of the cricoid cartilage. Now and then, I have even succeeded in obtaining a fleeting view down to the middle or even to the lower third of the cricoid cartilage.

This can be done very effectively by practicing the hypo-pharyngoscopy as suggested by von Eicken. In this technique the larynx is cocaineized, and a strong laryngeal probe introduced into it, and the entire organ drawn firmly forward. Another way is to pass a suitable instrument back of the larynx and to pull it directly forward.

These investigations teach us that the pharynx in its whole width extends downward posteriorly to the larynx, and narrows rapidly to a small medial zone, situated in the region of the lower third of the cricoid cartilage. It can be plainly seen that the side walls converge to this point and that the anterior wall, represented by the posterior wall of the larynx, is also directed to it in a straight line. Another noticeable fact: The more traction brought to bear on the larynx, the more does the posterior wall of the pharynx bend in a gentle forward curve to the above mentioned area. This, then, presents a well-marked point of juncture.

The question is, in what manner does the esophagus extend downward from this area which we have described as its beginning? To attain better facilities for inspecting the depth of the esophagus, I made the attempt to pull the larynx away from the vertebral column more energetically than could be done from above. I availed myself of the opportunity to experiment on three tracheatomized patients in the following manner. The sub-glottic area was thoroughly cocaineized around the tracheal wound. I then introduced a hook in an upward direction, and took firm hold of the cricoid cartilage itself. At the same time I made an inspection of the hypo-pharynx with the laryngoscope, directing the patient to bend the head well forward in order to relax the muscles of the neck. It was definitely determined by this technique that even with such intense traction the entrance to the esophagus (for as such we must evidently regard the above described area) cannot be made to gap. This orifice of the esophagus remains closed, and is pulled forward with the larynx. The posterior wall of the pharynx is tensely stretched, and well removed from the vertebral column above the entrance. So firmly is the orifice of the esophagus attached to the larynx that it is more readily drawn forward with the latter than that it is opened.

From this we must conclude that the mucosal surfaces in the orifice of the esophagus do not lie simply in contact with each other as in other similar mucous tracts, but that they are held tightly together by means of a tonic muscle contractility, a kind of sphincter. *A circularly arranged musculature distinctly guards the entrance to the esophagus.*

But furthermore, this musculature is evidently closely connected with the cricoid cartilage, or else it would not be possible to pull the orifice of the esophagus forward with the larynx when traction on the latter is made. Anatomical investigations prove that the portion of the constrictor inferior known as the crico-pharyngeus is thus closely connected. It begins on the side of the cricoid cartilage behind the crico-thyroideus, loops around the entrance of the esophagus, and reaches the other side of the cricoid cartilage. The element of tonic contractility of this muscle explains this phenomenon.

Additional data may be gathered by the employment of esophagoscopy. It is a simple matter to pass beyond the cricoid cartilage to the orifice of the esophagus with a properly selected esophageal tube, and then to push the tube into the depth of the esophagus while carefully inspecting this region. Here we find in an area of several centimeters a tightly closed passageway, the mouth part of the esophagus, the walls of which are made to open sluggishly by the pressure of the esophageal tube. From this point downward extends the open portion of the esophagus. A similar observation is made during the withdrawal of the tube, as has already been noted by von Mikulicz. In his treatise on esophagoscopy and gastroscopy, published in 1881, he observed that the entrance to the esophagus is kept closed by the constrictor inferior. As I have demonstrated, only the cricoid cartilage portion of this muscle is called into action, but evidently also the upper part of the orbicular muscle of the esophagus.

The fact that the esophagus from its beginning to its termination at the cardia consists of an open air-filled tube has been proven beyond a doubt by Mikulicz, who has also demonstrated this physiologically. The accuracy of this observation is proved in every esophagoscopy. Mikulicz has also demonstrated that the air in the esophagus is subjected to negative pressure. I thought for a time that this negative pressure might, perhaps, explain the closure of the orifice of the esophagus, and have attempted, while performing deep hypo-pharyngoscopy, to introduce a catheter into the air-space of

the esophagus. The orifice of this organ closed spasmodically around the catheter, but showed no tendency to gap.

This assumed sphincter closure of the orifice of the esophagus may well be compared with the similar function of the cardia of the stomach. The cardia is also closed by tonic muscle-contractility. This contraction is released reflexly during deglutition or emesis. What is the conduct of the mouth of the esophagus in this respect? I can present a series of most interesting observations regarding this. One case which especially directed my attention to these conditions has been reported by Karl von Eicken in his essay on hypo-pharyngoscopy. The irritation produced by the laryngoscopic mirror produced sensations of choking in a female patient. Von Eicken observed that a deep inspection of the hypo-pharynx orifice was wide open. In a favorable moment I had the opportunity to observe a most unusual phenomenon. *In the area of the lower third of the cricoid cartilage a thick, crescent-shaped fold protruded bilaterally from the posterior wall of the hypo-pharynx forward to the cricoid cartilage.* When we desired to make a further inspection of this condition, the patient unfortunately failed us, and would not open her esophagus again. This phenomenon impressed me greatly. I recognized the importance of this observation, and it occurred to me at once as similar to that known as Passavant's fold, which is formed, as we remember, in the region of the upper end of the constrictor superior opposite to the velum platinum, when the epi-pharynx is closed during speech or deglutition. Much to my regret, the patient would not submit to further examinations, and I was unable to get more specific data concerning this occurrence. The question was lost sight of until early this year, when the same patient presented herself again at the clinic. On this occasion, it was easy to produce the reflex choking sensations by tickling with the laryngoscopic mirror, resulting in dilation of the mouth part of the esophagus, and to expose to view convincingly and clearly this crescent-shaped fold, the lip of the mouth of the esophagus.

It was now to be determined whether this lip was an accidental anatomical peculiarity of our patient, or whether it was a usual occurrence. To this end I employed hypo-pharyngoscopy on a number of patients and attempted to produce symptoms of retching. While I was not always successful, I was able to produce the same results as in the above mentioned patient in a sufficiently large number of cases. The mouth of the esophagus gapped wide during the time of retching, and the crescent-shaped fold came plainly into

view. It was evident that it could not be simply a fold in the mucous membrane, but undoubtedly partly composed of muscle tissue. My experiments were unsuccessful when the retching was of so violent a character that no systematic observations were possible. By cocaineizing the parts well, the entire process could be so modified that another positive result was obtained. The regular occurrence, then, of this crescent-shaped lip of the mouth of the esophagus during retching can hardly be doubted. But, furthermore, we learn that the mouth of the esophagus acts like the cardia at the time of retching, which forms only a part of the process of vomiting, and during this process the cardia gaps at the same time with the mouth of the esophagus.

Observations of the conditions during deglutition were still wanting. The movement of retching is a retrogressive one, while that of deglutition is progressive. The technique of hypo-pharyngoscopy by means of von Eicken's modification of H. P. Mosher's long straight spatula gave me the opportunity to see this muco-muscular ledge during deglutition and also to observe the opening of the mouth of the esophagus. All the patients whom I examined in this manner could swallow with ease during the insertion of this narrow spatula. The lip of the mouth of the esophagus was thus exposed to view, and the mouth itself dilated.

It cannot be doubted, therefore, that a contraction-mechanism is located in the orifice of the esophagus similar to that in the entrance to the stomach. The observation explains a whole series of phenomena which, until now, were more or less obscure.

It is known that some persons are able to pass large quantities of fluid into the stomach without visible signs of deglutition after one or two efforts at swallowing have been made. The heroes of the "Kneipe" are a striking example. Evidently, the tonic contraction of the sphincters at the orifice and at the end of the esophagus is temporarily suspended by will-force in these cases.

We are probably correct in the assumption that the sensation of contraction and of the presence of a globus in the throat may be associated with marked contraction of the mouth of the esophagus. I recall to you the sensation during the act of rapidly swallowing highly carbonated waters.

Strictures following corrosion of the mucosa of the esophagus are frequently localized in the region of the mouth of the esophagus, because the acids have come more intensely in contact with this area. It is possible that the mouth of the esophagus presents a hind-

rance to the free passage of such acids notwithstanding the effort at deglutition because of this special contractility.

The mouth of the esophagus is also a favorite site for the lodging of foreign bodies. These coming in contact with the mucous membranes produce a contraction of the sphincters. I recall two cases, when coins had been swallowed which stuck in the mouth of the esophagus, where I could see distinctly a ring of contraction around the coin which offered considerable resistance during extraction.

Improperly masticated food containing coarse particles produces a similar irritation to that of foreign bodies. Only a soft food-bolus passes easily beyond the constricted portion of the esophagus. This accounts for the well-known spasms of the esophagus in cases where rapid deglutition of improperly masticated food-masses has been practiced for years. I have seen a large number of cases of this kind. The patients locate distinctly a feeling of constriction in the region of the mouth of the esophagus and complain that food passes this point with difficulty. Spasms of the esophagus may be correlated with spasms of the cardia, and both are frequently due to secondary neurosis in chronic diseases of the stomach. In explaining the dilation of the esophagus following spasms of the cardia, the possible relation of the mouth of the esophagus must now always be considered. This dilatation is more easily comprehended when we consider that the bolus is compressed between two sphincters.

These observations may throw some light on the question of the origin of pulsating diverticula of the esophagus. We now know that these diverticula should not be considered as belonging to the esophagus, but rather to the hypo-pharynx, because in all instances they are located above the crescent-shaped lip of the mouth of the esophagus. This lip is identical with the ledge of the diverticulum, as I have previously designated it. Dissections of the musculature of this area when such diverticula exist substantiate my theory. The hypertrophied fibres of the crico-pharyngeus pass through the ledge of the diverticulum, which extends backwards, and must be included in the posterior wall of the hypo-pharynx. It is easily comprehended that this wall must distend with increased pressure during deglutition, for the anterior wall of the hypo-pharynx is formed by the posterior surface of the cricoid cartilage. A small pocket located above the lip of the orifice of the esophagus may gradually widen, and develop to a sack of considerable size. As a rule, this condition is observed in patients of advanced years, who have been in the habit of masticating poorly and swallowing rapidly.

These pulsating diverticula are analogous to dilations of the esophagus following spasms of the cardia. We may safely assume that spastic irritations in the mouth of the esophagus may contribute somewhat to the formation of such diverticula.

I do not wish to claim that this theory concerning the formation of diverticula in the region of the hypo-pharynx is sufficient. It is not to be concluded that this mechanical theory concerning the formation of diverticula in the region of the hypo-pharynx, which has been inaugurated by Zenker, is sufficient to explain it. It is well known that von Bergmann has always claimed that heredity is the cause of such diverticula. In my opinion both theories are probably well founded. It appears to me that diverticula with narrow orifices occurring in young subjects can scarcely be considered as of distinctly mechanical origin. We have lately had such a case under observation, and have studied it with all the means at our disposal. Here the impression prevailed that there must have been a predisposition to the formation of such a diverticulum, which developed mechanically into a sack. I remember from my investigations concerning the bursa pharyngea that in certain mammals pharynx diverticula in this region are a common occurrence. Why should not this be the case in man, though, of course, in very rare cases? Perhaps chance will answer this interesting question for us some day.

39 Friedrichstr.

LOSS OF VOICE IN SINGERS.*

MR. W. J. HENDERSON, NEW YORK CITY.

Finding myself by some strange freak of fortune asked to disclose my opinions in the presence of scientific men who deal only with facts, I take refuge in the comforting reflection that sometimes even the doctor has to guess again. What I have to put before you is the meagre result of twenty-five years of observation and study as a music critic. I have in these years been a "looker-on here in Vienna." You have been lookers-in. I have listened to what came out of throats and wondered sometimes how it could, while you have had opportunities to look into the throats and see what these extraordinary emissions, called singing, have done to them. If my fund of information lacks scientific value, perhaps it may interest you as the view of a rank throat outsider.

In all of the years of my service as a critic, I have noted but one case of actual loss of voice, traceable, perhaps, to diseases not caused by misuse; but I have seen many of artistically fatal deterioration, unquestionably caused by bad singing. The possessors of these deteriorated voices could still emit tones of more or less discomforting quality and marrow-touching power. With the aid of former reputations, stimulated by the efforts of youthful and ingenuous reporters, these singers continued to throw vocal dust into the eyes of the public, which is easily led to believe that one employed at the opera and receiving a large salary, must be a great artist. Opera goers, of all music lovers, are the most afflicted with tone deafness, and they have an especial predilection for people who sing very loudly and a little off the pitch.

After all these years of observation, I have come to the conclusion that the principal cause of voice deterioration in singers is method. There are to-day not less than what Omar Khayyam would have called two-and-seventy jarring sects in vocal method, and the children of every one of them are perfectly certain that the disciples of the others are musically damned beyond redemption. Naturally, pupils are in one of two states: either they have a wrong method of singing, or they have so many methods that they have none at all.

* Paper read by Invitation before the Laryngological Section of the New York Academy of Medicine, April 24, 1907.

Students of vocal art might possibly escape the dangers of too many methods, if they were less eager to become great opera singers and get a thousand dollars a night. But, alas! if they shun Scylla, they are likely to fall upon Charybdis. If they obtain not too many methods, they are almost certain to acquire too much method, and the last estate is as bad as the first. Consider first the fate of the youthful student who is burning with the get-rich-quick fever, and is eager to go before the public at once. Pupils of this type study a few months with one master, and finding themselves unprepared to deliver "*Ritorno vincitor*" or "*Dalla sua Pace*," rush off to another. All these teachers have fads. Each one professes to have found in some particular the great fundamental law of tone formation. The pupil gets one theory from this teacher, another from that. He makes no progress, and in a year he knows less about the art of singing than he did before he began to acquire misinformation about it. Finally he comes to the conclusion that he knows as much as any of the teachers, and he forthwith embarks upon his career unequipped with any principles of voice production. He is continually experimenting on his own voice, and always laboring under the fear that it does not carry. Consequently he sings as hard as he can and tears his poor throat to pieces. The inevitable result is either relaxed vocal cords or those disastrous little swellings with which all of you, gentlemen, are familiar.

Now let us consider the case of the victim of too much method. Too many of the vocal teachers of to-day teach not tone, but physiology. Instead of being musical professors they strive to be instructors in anatomy. Permit me to illustrate what I mean by pointing to an example. I sometimes send pupils who have fallen into injurious habits to a teacher who can dissect a larynx with the skill of a physician. He knows the offices of the muscles and the nature of the cartilages. But he utilizes that knowledge in his teaching in the only way in which a teacher should use it. By means of it he discerns what artificial pull or constriction each pupil has acquired, and puts him through a course of vocal exercises designed to correct the habit. But he does not tell his pupil what muscle to contract in order to counteract the damaging strain on the other.

This is diametrically the opposite plan practiced by the typical singing teacher. Knowing the anatomy of the throat only in a vague and unscientific way, he attempts to teach physiological singing. He tells the pupil that for this tone he must raise the soft palate, and for that he must lift the larynx. For this tone he

must think of his epiglottis, and for that he must never forget that the anterior portion of the vocal cords alone is in vibration. In a word his system is to proceed from the mechanics to the tones,—to teach the pupil how to pose his vocal organs in order to get the right sound. The greatest teachers of singing that ever lived were those of the latter end of the seventeenth and the beginning of the eighteenth century. Porpora, Redi, Fedi, Bernacchi, Pistocchi,—these were some of the men who gave the world the mighty singers of the Handelian era, Farinelli, Caffarelli, Faustina, Tesi, Cuzzoni, and their compeers. These teachers lived long before their distinguished successor, Manuel Garcia, devised the laryngoscope, and long before masters of the voice knew much, if anything, about the anatomy of the throat. These teachers taught according to the empirical method, from the tone to the mechanism. They endeavored to bring their pupils to a conception of the ideal singing tone, and then to teach them to hear themselves. Their fundamental principle was that, if the tone is perfect, the vocal organs will be acting according to their nature, and the voice will be strengthened and not injured by the normal exercise of its artistic function in song. Their ideal was complete absence of all constriction or hardening of throat muscles, perfect ease and elasticity of the entire vocal apparatus, from the bottom of the chest to the tip of the tongue, an expenditure of just as much breath as the tone required, and no pushing, pulling, or forcing of any kind whatever. Beauty of tone and flexibility of delivery, such as they taught their pupils, could only be acquired when all the organs were in an absolutely elastic state. That was the vital truth which they recognized and they contented themselves therewith. The modern teacher too often strives to substitute for a conception of the ideal tone a mental picture of the operations of the throat in its formation, and the result is a destructive attempt on the part of the pupil to operate voluntarily parts which nature never intended to have brought under the direct control of the will.

These two things, ignorance of any method of singing and acquaintance with a radically incorrect method, are the most prolific causes of voice failure among singers. Let me now specify one or two of the exemplifications of bad instruction. One of them is to be found in strained and unnatural methods of breathing. Among singing teachers there are more theories of the manner in which a human being draws his breath than any of you physicians ever dreamed. What you do not know about the right way to inspire

and expire would fill fifty volumes the size of Austin Flint's "Practise of Medicine." One teacher puts so much stress upon the matter of breathing that he has forgotten how to teach anything else. The result is that his pupils are a set of walking wind bags, but they cannot make tones. An expansion of three inches is regarded with contempt in the classes of this teacher. Likewise does he sniff at a mellow and far-reaching pianissimo, such as Sembrich sometimes floats to the galleries of the Metropolitan. "Blow winds and crack your cheeks?" cried King Lear; blow winds and crack a voice is this tornado method.

Breathing exercises are, of course, desirable as long as they follow the method of nature, but unfortunately most breath specialists teach their pupil that the prime requisite is a vast volume of breath. Some of these poor deluded students struggle to govern their tones with their chests strained to the utmost expansion and their throats tied up in knots to prevent the air from bursting forth in one fell swoop. Their attitude and state in the act of vocal delivery suggests the existence of painful laryngeal constipation.

I am convinced that bad attack is one of the commonest causes of deterioration in the quality of voice. The ideal attack of tone is seldom acquired. Sometimes nature bestows it upon a singer as she did in the cases of Patti and Melba. When Mme. Melba opens her mouth the tone flows out like sparkling water. The ear cannot detect any attack. Most singers begin, especially when the attack is on an open vowel, either one way or another that is wrong. Some send out a portion of the breath before bringing the vocal cords together, so that previous to the beginning of phonation we hear a hissing sound. This is the aspirated attack. The other bad habit consists in firmly setting together the cords and hurling them apart just before the breath reaches them. This trick causes every attack to begin with a clucking sound, and is known to the singing profession as the "stroke of the glottis," an unscientific description whose origin you, gentlemen, can easily discern. The second of these tricks is more injurious to the voice than the first. Indeed, I am not certain that the first works any physical injury at all, while I feel quite sure that the second does. In fact, I believe, though I hesitate to offer an opinion in this presence, that it is one of the most destructive of all vocal practises. It is in high favor in France where singing voices rarely have the liquid mellowness and pearly purity found in the best Italian and American organs. I am inclined to believe that it is found most frequently in company with

that piercing metallic quality which is so dear to habitues of the Paris Grand Opera, and which Lucinne Breval and Aino Ackte so vainly endeavored to induce Americans to like. Dr. Holbrook Curtis, who has had large experience with singers, believes that the forcible stroke of the glottis is death to the voice. I cannot, of course, presume to comment either favorably or unfavorably on a physician's dictum; but I am prepared to say that I have noted a dozen cases in which persistent employment of this method of attack has robbed the voice of all its vibrancy, and transformed its quality from that of a silver flute to that of a wooden xylophone.

Two more agencies in the destruction of singing voices must be noted. Of these one has found a happy hunting ground in the Metropolitan Opera House. This is the Big Tone habit. Every one burns with ambition to play the lion, like Bully Bottom, and roar so that the Duke will cry, "Let him roar again." The Duke in this case happens to be a long row of imported opera goers who stand behind the orchestra rail and shriek "bravo, bis!" every time they hear a loud sound. They set a terrible temptation before the singer, whose sensitive spirit yearns for signs of approbation. If he can get them by throwing artistic chastity to the winds and prostituting the physical beauty of his voice to the carnal desires of these creatures, it is hard for him to resist.

I am certain that most of you are familiar with the American demand for the biggest in everything. The intrusion of this demand into the realm of musical art is not recent. We ask for the biggest choruses, the biggest orchestras, the biggest organs, the biggest salaries for conductors in all this world. It is small wonder that when we go to hear singers we ask for the biggest voices, and it is not at all strange that the singers strive to meet our demand. Our opera houses resound with the noise of mighty bellowings, and this glad sound gives the people great joy. It would be impertinent for me to tell you, gentlemen, what the physical result must be. You know better than I do what becomes of the resiliency of muscles and ligaments continually strained to their utmost. The normal sonority and vibrancy of voices gives way to a wooden reverberation which is as unmusical as the hammering of paving blocks. But still the merciless public goes on clamoring for the big tone, the huge sound, and year after year beautiful voices are sacrificed to this pitiless Moloch.

This form of overwork of the vocal organs is associated with another equally destructive, and that is singing too often. All

singers are willing to overwork themselves. I have heard some of them advance the comforting theory that it was better for them to sing all the time than twice a week. If they would always sing well within the power and compass of their voices, doubtless daily exercise of the organs would be beneficial. But surely daily strain is not. But here again enters the get-rich-quick fever. Sing often, and get more salary; that is the golden rule of the thrifty artist, whose art is usually dear to him precisely in proportion to the amount for which he can sell it.

One more cause of vocal deterioration must be mentioned. In my opinion this is the most dangerous and common. Nearly all singing teachers profess to enlarge the compass of the voice. That teachers offer to do this is an evidence of the existence of a demand for it. The truth is that every singer is desirous of possessing an amazing range of tones. The bass boasts that he can sing the F above his clef; the baritone that he can sing high G; the tenor waxes proud and haughty when he can go his breed one better, and can sing high C sharp. The contralto carries a nose pointed toward heaven when she can sing soprano roles, and the soprano is filled with pomp and pride and circumstance when she can boast a range of two and a half octaves. She would then speak disparagingly of Agujari—if she had ever heard of her.

Opera singers are continually striving to sing roles for which Nature never intended them. They labor and strain and outrage their throats day after day with exercises for extending the compass. Their exercises, you will permit me as a student of the technique of singing to say, are devised on a plan contrary to common sense, and are damaging to the vocal organs. Allow me to illustrate by physical analogy; an athlete does not acquire muscular strength by daily exercises which overtax him. The man who hopes to become a dumb-bell raiser does not set out with 140 pounds as his standard and torture his muscles to get to do it. The man who aspires to become a sprinter does not bind himself to do a hundred yards in ten seconds flat. Each of them aims so to develop his powers by normal and comfortably borne exercise that, when once in a while a supreme effort is required, the elastic and responsive muscles are capable of it. When that effort is made, it goes just to the limit of that particular man's physical powers, and not a jot beyond them.

But when a woman whom nature gives a voice suited to such roles as Fides in "*La Prophete*," determines she is going to sing

Amneris in "Aida," and begins laboring to hoist her voice up to the necessary range, she can only do so at a sacrifice of the noble lower tones which God gave her, and that, too, without getting anything valuable in exchange. The tones of forced up voices always sound strained and in time are lost. So, after all the artificial career is short-lived and the proud singer is in the end exposed to humiliation. In many instances the beauty of the voice is entirely obliterated by these struggles to alter its nature. Doubtless in some cases actual loss of voice results. At any rate, I am inclined to believe that the one case of actual loss which has come under my observation was an essay at singing roles which required a high, brilliant and vigorously declamatory delivery from a singer whose voice and acquired style lent themselves rather to smooth, sonorous and beautiful production of tones ranging two octaves upward from A below the staff. Please do not misunderstand my point here. I do not mean to say that this singer could not sing a C above the staff, and that singers with voices in the medium scale may not safely sing high tones occasionally. What I regard as dangerous is the effort to sing roles of which what the Italians call the "tessitura" is too high. That is to say, the average, or rather the major portion of the part is too high. The voice which is at home in the middle of the scale is kept continually singing in the upper register, where it cannot stay without severe labor and distressing strain on the whole tone-producing apparatus.

It is pretty difficult, perhaps impossible, to say what can be done about this. It is a matter entirely in the hands of the public, and it could not be in worse ones. The public demands brilliancy. It revels in high tones. There is more satisfaction in an opera house over one high C than over many perfect interpretations of "Voi che sapete" or "Ah si ben mio." If Mme. Sembrich does not take the high D flat at the end of the sextet in "Lucia," there is a feeling of noticeable disappointment. If Mr. Bonci interpolates a high C in the sextet in "Les Huguenots," there are general demonstrations of great joy. When it is announced that Mme. Fremstad, who used to be a contralto, is hereafter going to be a soprano, women smile at one another and men shake hands. Meanwhile the business of the laryngologist grows apace, for these outraged throats have to be taken very often to the doctor, whose excellent advice that they need long rest is systematically ignored because that way lie silence, the departure of glory and the dark, dismal absence of dollars.

I do not imagine that I have said anything which you did not know before. All that I have said about opera singers applies to singers in other fields. Insufficient knowledge of vocal art, a foolish belief that they have learned how to direct their own cricothyroid muscles through the acquisition of some half-baked anatomical information, the big tone and get-rich-quick crazes, and the general want of high, artistic ideals,—these are the chief causes of voice deterioration which have presented themselves to my observation. You gentlemen will, of course, know at once the physical results of the injurious practices, and for that reason I have not had the temerity to mention them. I do take the liberty of reminding you, however, that medical science has a hard battle to fight in treating all the afflictions brought on by ignorance, neglect and downright wickedness.

"New York Sun."

Case of Esophageal Stricture Cured by the Use of Thiosinamine.

HEINRICH HALASZ. *Monatschr. f. Ohrenh.*, Berlin, Dec. 1904.

A boy, 17 years old, who attempted to commit suicide by drinking sulphuric acid, had a stricture of the esophagus, 14 cm. from the teeth, which would not permit a bougie, 3 mm. in diameter, to pass. Six injections of 1 cc. of a 15 per cent. solution of thiosinamine were made between the shoulder blades, at intervals of three days, and bougies were passed daily. At the end of this period the patient could swallow well and a large bougie could be passed.

YANKAUER.

THE INDICATIONS FOR AND THE ADVANTAGES OF THE
INTRANASAL ROUTE OVER THE RADICAL OPERATION
IN THE TREATMENT OF CHRONIC SYMPTOMS OF
THE ANTRUM OF HIGHMORE, AND THE
TECHNIQUE EMPLOYED.*

BY ROBERT C. MYLES, M. D., NEW YORK.

After twenty years of experience in treating diseases of the Antrum of Highmore, the writer has arrived at the conclusion that 85 or 90 per cent of the cases demanding surgical interference should be operated upon by the intranasal inferior meatal route.

When considering an operation upon the Antrum of Highmore by the intra-nasal method, one should be thoroughly familiar with the many possible anatomical irregularities, and should analyze them carefully before making the operation. This is especially true of the small antrum with its floor situated above the level of the floor of the nose. The area of election for operative procedure is a space on the naso-antral wall between the floor of the nose and the attachment of the inferior turbinated crest. The practical available dimensions are about one inch antero-posteriorly, and one-fourth to three-fourths inch vertically. Parts of three bones go to make up this operative area; viz., the superior maxillary, the palate and the inferior turbinate. They are very thin, but of flinty hardness. The thinnest segment is the upper posterior part; the thickest is the lower anterior section. The posterior three or four millimetres of this wall usually contains the posterior palatine canal, through which pass the posterior palatine vessels and nerves. Great care should be exercised to avoid wounding this canal and its contents. The nasal ostium of the naso-lachrymal duct is situated anteriorly and superiorly to this surgical area, and it is wise not to cut nearer to this ostium than four or six millimetres.

In the milder cases, I have occasionally operated through the wall of the middle meatus, in some instances removing the lower lip of the hiatus semilunaris and cutting away the wall down to the crest of the inferior turbinate bone. For the initial incision, a short stiff knife is employed, having the blade set at right angles to the shaft and slightly hooked at the end. This is followed by the use of the author's punch forceps and the chisels which cut outwardly.

* Read before the New York Academy of Medicine, Section on Laryngology and Rhinology, March 27, 1907.

Other cases I have operated upon with the same technique through the middle meatal wall on a lower plane than the hiatus and about one-half to three-fourths of an inch further posterior where there is usually a dehiscence in the bony wall. However, I have not found this route desirable in cases of extreme and extensive disease.

One of the chief advantages, negatively speaking, of the intra-nasal over the extra-nasal route, is that the operator is not able to thoroughly curette the antrum, one of the evils of the radical operation concerning which the writer has warned the profession on different occasions for many years.

In a paper read before this section on the fourth Wednesday in January, 1893, and published in the *New York Polyclinic Journal* February and March, 1905, we said: "An operation which we have performed with some good results consists of sawing away the anterior end of the inferior turbinated bone from its attachments to the superior maxilla, and then clipping off about one-half inch with the curved scissors. This usually affords a good opportunity to pass a trephine or drill into the antrum, and allows curetting, packing with gauze, and subsequent irrigation. Cocaine, properly applied locally and hypodermically, allows this operation to be done without giving rise to much pain. The bleeding is usually free for a time, and is the most annoying consequence. It is difficult to curette the parts well through an opening in the inferior meatus, as it is almost impossible to cover all the area, even with the malleable-handle curettes." I also presented a case at that meeting which had been operated on by the intra-nasal route illustrating the method employed. At that time the results obtained were not so brilliant as now, because the openings made with the trephine and drill were too small for free and permanent drainage and ventilation, and apertures frequently healed over in a few months. Some of these cases recovered entirely, while others were later relieved through the canine fossa and malar ridge. It was observed that a decided and permanent improvement was secured *pari-passu* as the size of the hole approached the dimensions of one-half by three-fourths of an inch.

In a paper read before the 27th annual congress of the American Laryngological Association, June 1st, 1905, I said that after having performed several hundred operations through the canine fossa and malar ridge, and more or less thoroughly curetting the antral

walls, I had practically abandoned that procedure, in favor of the intra-nasal route.

In my opinion the intra-nasal route should be adopted in all cases except those in which there is positive evidence of dead bone or neoplastic growth within the cavity, and even in those instances it is at times expedient to do an exploratory operation through the inferior meatus. Only about one-tenth of the cases which have pus within the antra require operative interference, at least this has been the result of my observation and experience. Muco-pus in the antra, following an acute influenza or acute rhinitis, usually lasts



Fig. 1.

from three to six weeks and the patient's recover without any interference. This class of sub-acute cases should be excluded from our consideration of empyema of the antrum of Highmore, but if we are simply looking for more walls to hew and hack we could increase our statistics to any desired number and report antra which at operation were filled with muco-pus.

It is the chronic case which neither time nor irrigation through the natural opening seems to aid, that demands surgical interference.

The writer presents several instruments which he has found almost indispensable for securing a large enough aperture. The first

steps in the technique are practically the same as those described in his paper fourteen years since.

Half an inch of the anterior end of the inferior turbinal is removed by making an initial incision with a saw (Fig. 1) and continuing the same with a heavy pair of Knight's scissors (Fig. 2.) along the attachment of the turbinal to the superior maxillary bone and the inferior turbinated crest. A cross-section is then made with a Bosworth or a Jarvis snare (Fig. 3), care being exercised to remove only a part of the anterior third of the inferior turbinated bone. Fig. 4 demonstrates a condition where too much of the in-



Fig. 2.

ferior turbinal has been removed. A small firm tampon placed beneath the turbinal in some cases will lift it upward and against the septum out of the field of operation. In addition to the surface and infiltration methods of applying cocaine, the writer now uses 1-1000 solution of adrenalin in the same manner. He also uses his long sharp and blunt-pointed platinum needles.

In many cases where there is an extreme deviation of the septum toward the side of the operation, I force the septum over temporarily and use a small curved chisel, operating almost entirely by the sense of touch and a knowledge of the unseen anatomy. A curved chisel, either semi-cylindrical or V-shaped (Fig. 5) is placed

high up near the crest and made to penetrate in an outward and upward direction, in order that the first entrance may be easily made and that the size of the antrum may be determined by the flexible probe before further steps are taken.

At this stage the author introduces about 6 or 10 drops of a ten per cent solution of cocaine, with six or ten drops of 1-1000 solution of adrenalin. If the field is clear he then makes two or three additional punctures lower down or enlarges the original opening. If it is a case in which the field of operation can be readily inspected,



Fig. 3.

a specially constructed Curtis trephine is used to enlarge the opening downward as near to the floor of the nose as possible. When operating many years since, he noticed that an ordinary nasal trephine would cut the mucosa at the point where the hole is made in the barrel near the shaft. If the nasal chamber is of sufficient size to allow the use of the large strong punch forceps the desired amount of bone is easily removed; on the other hand, if the naris is very narrow it is necessary to use the small size punch forceps, as well as the small chisels which cut inwardly and outwardly. The use of a hammer and sharp chisel which is not allowed to bite too large a piece rarely causes objectionable jarring of the head.

The bone near the floor of the nose is usually very thick and hard, and is best removed by drill and trephine when it is possible to use them.

The writer presents a curette with eight blades (Fig. 6), four of which cut the margins of the upper walls, and the other four the inferior margins of the lower wall. It is set in a shaft and handle seven and one-half inches long, and is placed at right angles to the shaft. There is a head on the distal end of the curette 6 to 10 mm.



Fig. 4. Turbinotomy Inferior. Showing too much Removal.

in diameter, which slides along the inside of the antrum and holds the curette in position while the operator is enlarging the opening in the direction he may elect. This instrument is made in three sizes by W. F. Ford & Co.

The writer also makes use of six circular chisel punches, four of which cut both ways, and three or four of which cut only towards the outward stroke. He has been able to use these successfully when other instruments and methods have failed.

The punch forceps are introduced closed, and when the blades are near the perforation they are opened. The uppermost one being

at right angles to the shaft, is introduced through the hole made by the chisel, and the posterior part of the meatal wall is carefully and rapidly bitten away to within a few millimetres of the posterior palatine canal.

A pair of strong-bladed punch forceps is then introduced for the purpose of cutting away the superior part of the bony wall, which



Fig. 5. V-shaped Chisel.

bone is situated just beneath the crest of the inferior turbinate. These forceps are placed on a shaft three and one-half inches long, which has a curve on the distal end of about 45° . A curved chisel, made after the triangle or Killian pattern, has the greatest efficiency of any, when we consider the dynamics of the impact of the hammer.

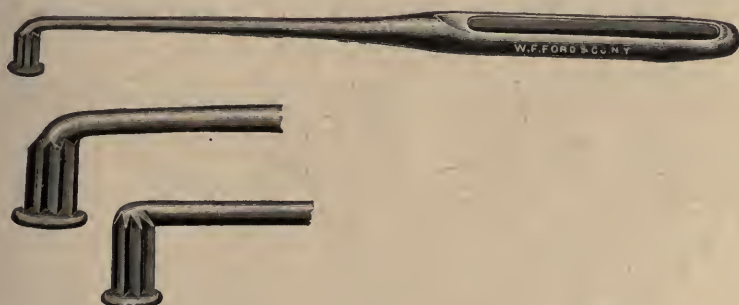


Fig. 6. Curettes for Rim of Antrum Wall where Perforation has been made.

When an opening has been secured three-fourths of an inch to one inch long, antero-posteriorly and one-third to three-fourths inch vertically, all the edges of the hanging mucosa and periosteum are trimmed off, the cavity is carefully curetted in all possible directions with the malleable handle curettes, and after an insufflation of powder of boric acid and aristol—equal parts—the cavity is packed moderately firm with one-half inch iodoform gauze, as is also the region of the inferior turbinal wound.

After 48 hours all packings and dressings are removed and left out permanently. I have found that many cases do better without frequent irrigation, and consequently allow some cases to be washed out only once in several days. Daily insufflation through a silver catheter of two or three grains of the aristol and boric acid powder has seemed to be the most favorable dressing for the average case.

In several of the cases in which polypi filled the antrum, causing distressing asthma, bronchitis, and general emaciation, the patients have made more favorable progress after this operative procedure than those who are operated upon by the canine fossa and malar ridge methods. In a series of these cases, I have noticed that the antrum would be entirely free of the muco-purulent secretion for months, and that when a general acute cold or rhinitis occurred the antrum would refill for a week or two with the muco-purulent secretion which would again disappear as soon as the general symptoms ceased.

I have watched for evil or unfavorable consequences from this procedure, but have not noticed that any permanent impairment of the nose, rhino-pharynx, or larynx could be traced to the absence of the small piece of turbinal and the partition between the inferior meatus and the antral cavity.

I am pleased to have an opportunity to again repeat and emphasize my opinion, expressed so frequently before this section, that the essential and most desirable condition for any diseased sinus of the head is that its free drainage and free ventilation be secured and maintained, excluding those smaller and minute cells where obliteration is indicated.

46 W. 38th St.

TUBERCULOSIS OF THE ACCESSORY SINUSES OF THE NOSE.*

BY J. W. GLEITSMANN, M. D., NEW YORK.

Although Tuberculosis of the Accessory Sinuses is a rare occurrence and more of pathological than clinical interest, it is, nevertheless, of sufficient importance to engage your attention in more than one direction.

Pulmonary tuberculosis furnishing by far the largest mortality, it would not be surprising, if, in life or at least at post mortem, accessory sinus diseases were more frequently observed, and investigations as to their relation are not missing. Of the many authors, who examined the sinuses of patients having died from tuberculosis, I shall quote only a few. Wertheim¹, found in 306 post mortems 165 times, and amongst 106 tuberculosis subjects 31 times accessory sinus disease in general. Minder² found in 17 tubercular cases the sinuses diseased four times. E. Fraenkel,³ in 48 cases, 9 times. Dmochowski⁴, confined himself to the maxillary sinus and saw in 29 tubercular subjects only 3 times pathological changes. He is also the only one, who, to the best of my knowledge, and with a careful search of the literature, found tubercle bacilli in an accessory sinus, viz., the maxillary, which had not been diagnosed or treated during life. A much larger ratio appears in a recent publication by Oppikofer,⁵ viz., 25 sinus affections in 51 tuberculosis cases. But with the exception of the last author the writers are not inclined to believe tuberculosis to be a preponderant cause for general sinus disease, other affections, especially empyema, being by far more prevalent.

It is difficult to determine the etiological factor in many instances, as several writers confine themselves to the short report of the observation of a case and important data are missing. But from the histories furnished, we learn, what is to be expected, viz.: that the majority of sinus tuberculosis is due to an extension from a neighboring tuberculous focus. Of the twenty cases of tuberculosis of the maxillary sinus, which I could find, twelve were due to tubercular lesions of the bones of the nose or upper maxilla, whilst in the remaining eight carious processes of these parts can be ex-

* Read before the Twenty-ninth Annual Congress of the American Laryngologica Association, Washington, D.C., May 7, 1907.

cluded. The majority of patients suffered from pulmonary tuberculosis, and a few only had the well-known symptoms of antral empyema without any constitutional disturbances, but at operation tubercle bacilli were found in the discharge evacuated. In eight instances the presence of tubercle bacilli in the antral secretion was verified by microscopical examination.

Tuberculosis of the other accessory sinuses seems to be extremely rare, viz.: four cases of the frontal sinus and one of the ethmoidal and phenoidal sinus combined, which latter presented a most extended and destructive lesion of all the four sinuses.

The pathological conditions in sinus tuberculosis are very much the same as in nasal tuberculosis. Aside from the manifest lesions as empyema, exuberant granulations, cheesy deposits, caries, mentioned by the writers, Weinberger⁶ made careful microscopical sections of the diseased antral mucous membrane. The epithelium was exfoliated in many places and a considerable small-celled infiltration had set in, penetrating the superficial as well as the deep layers of the mucosa, whilst the middle strata showed the fibrous structure of the connective tissue containing serous liquid and some leucocytes. The efferent glandular ducts and their lumina were enlarged, giving rise to cystic spaces, and giant cells were found in the infiltrated tissue. In his case, no tubercle bacilli could be found in ten sections made.

Although in many cases we have to be satisfied with the clinical statement of tuberculosis without the proof of the presence of tubercle bacilli, and a rigorous critic might feel inclined for this reason to eliminate one or the other case, I have ample reason to believe that all the reports have been made in good faith, and I personally have no doubt as to their true tubercular nature. All the references in this paper have been searched for and read by myself in their original publications, and I can vouch for their correctness. Tuberculosis of the maxillary sinus has been reported by Coakley⁷, Demme⁸, Gaudier⁹, Gruenwald¹⁰ (two cases), Keckwick¹¹, Neufeld¹², Neumayer¹³, Rethi¹⁴ (two cases), Weinberger⁶, Maydl¹⁵, Avellis¹⁶, Panse¹⁷, Dmochowski⁴, Killian¹⁸, M. Schmidt¹⁹, Zander²⁰ (two cases), and Wertheim¹. In my opinion, more tubercular sinus cases do occur, and would be reported as such, if the contents of the sinus were regularly examined and the nature of the morbid process more carefully studied. Avellis quotes a number of authors relating cases of antral empyema similar to his own, in which empyema had previously been diagnosed, but a tubercular lesion due to extension of

caries and tubercle bacilli were found when he took charge of the child.

I shall not weary you with a narration of each individual case, and only refer to some clinical features in general and relate a few especially interesting histories. The presence of caries in 12 cases has already been mentioned; empyema, although not always specifically stated, can be assumed to have been present with exception of three cases. Extension of tuberculosis from a diseased alveolar process through dental fistula took place five times; through the canine fossa, once. Lupus of the nose was the cause in two patients.

Only three cases could be found, in which the tuberculous process was confined to the antrum of Highmore alone without manifestations in any other locality. Our member, Dr. Coakley, further, Gaudier and Keckwick, were fortunate enough not only to observe this extremely rare occurrence, but also to be able to report a cure at the time of their publication. Coakley's case presented the usual symptoms of antral empyema, but after the operation tubercle bacilli were found in the discharge. The lungs were examined by Dr. Le Fèvre and Janeway one month later and found healthy.*

Gaudier's patient, a man of 40 years, suffered for several years from toothache and discharge in the left nostril. An exploratory puncture in the lower meatal wall revealed bacilli in the evacuated pus, and was followed by the radical operation through the canine fossa, and with appropriate treatment by a cure. Gaudier emphasizes the rarity of his case, in which tuberculosis was limited to the sinus, and only symptoms of empyema existed. Keckwick, a British dental surgeon, has the misfortune not only to have his name misspelled wherever quoted, and to appear in a standard throat work under a different name in the text from that in the literature appended, but also to have his publication everywhere referred to journals giving abstracts only, and never to the original with one exception. His patient, a woman of 30 years, had the usual symptoms of empyema of the sinus, which was opened through the socket of the second bicuspid and treated without improvement during twelve months. At last the pus was examined, tubercle bacilli found and the patient discharged cured after three months, but later lost sight of.

* It affords me great pleasure to learn from Dr. Coakley during the discussion following the reading of the paper, that he had seen the patient as late as one year ago, when he was in good health, without any local or general manifestation of tuberculosis.

Two more cases had a favorable issue. In the patient of Neu-field, the disease began at the alveolar process, from which a fistula extended into the sinus, which was freely opened, curetted and a sequester removed. The communication between mouth and sinus remained, and was kept closed by a plate. Demme's patient was a nurse, who had attended to four children of non-tuberculous parents, but who, all four, died from primary intestinal tuberculosis. A few months after the death of the fourth child, the nurse consulted the doctor for a dental fistula existing several years, and a recent facial neuralgia. Demme found an old lupus at the septum, swelling of the face and a putrid secretion from the fistula of the right molar. Repeated scrapings and cleansings effected a cure. The infection of the children was caused by the habit of the nurse of tasting the food before giving it to the children.

The last case I shall relate is the severest I found on record, affecting all the four sinuses and having a rapid fatal issue. Panse saw a 16-year-old girl, who had been operated upon several times for nasal polypi. One month after the last operation she became suddenly blind. As disease of the frontal or sphenoidal sinus, involving the optic nerve, was suspected, they were opened and necrotic bone removed. Antisyphilitic treatment had no effect, the patient's condition grew worse, and after giant cells had been found an extensive operation was performed, consisting in splitting of the nose, removal of the nasal bones, the ethmoidal and sphenoidal bone, with exposure of the cerebral frontal lobe. Death took place after a short improvement. At post-mortem an old diseased focus was found in the apex of the right lung, tuberculosis of the cervical and bronchial glands, destruction of the optic nerve, circumscribed meningitis, and a tuberculous focus in the middle of the left parietal bone with cheesy pus.

Panse's case is the only one I could find in which tuberculosis of the ethmoidal and sphenoidal sinus occurred. It is also one of the four frontal sinus cases on record. The other three have been published by Frank and Kunze²¹, Vohsen²² and Schenke²³. Frank and Kunze's patient had general tuberculosis, a swelling at the frontal sinus region, and at operation cheesy masses and a focus at the posterior sinus wall, extending to the dura, were found.

Vohsen's case had a fistula in the frontal region, leading to carious bone, and cheesy masses in the sinus. The ultimate issue is not stated in both cases. A typical case is reported by Schenke of a man, 18 years of age, who suffered from tuberculosis of the middle ear and of the cervical glands. When admitted to the hos-

pital, he had a swelling of the frontal region and a fistula of the mastoid process, extending posteriorly towards the cranial basis, and another one leading to the styloid process. A few days after the fistulous ducts had been scraped, the frontal sinus was operated, and tuberculous masses appeared immediately after incision of the skin. A fistula led to the left sinus, which was thoroughly curetted after complete removal of its anterior wall, and communication with the nose was established. Death took place twelve days after his admission. Post-mortem showed an abscess of the left mastoid process, extending to the cranial base, and the occipital foramen, into the interior of the cranial cavity, tuberculosis of the frontal sinus, but no perforation into the cranial cavity.

From all the data related, it is evident that the prognosis is as unfavorable as the treatment is unsatisfactory. If we analyze the cases carefully, we cannot say with any degree of certainty, if one of the few patients who appeared cured at the time of the publication, remained so definitely, as they were not observed sufficiently long after the operation. On the other hand, Panse's case teaches us, what rapid and destructive lesions can occur in accessory sinus tuberculosis.

The treatment is eminently surgical, and does not differ much from the proceedings generally adopted in severe cases of empyema of the sinuses. It has naturally to be more radical, as not only the soft parts, but also the diseased osseous tissue, have to be carefully and thoroughly removed, to eliminate if possible, all traces of the area involved. Supporting the general health, combatting the drain on the system and encouraging the patient's mental condition is our duty here as well as in many other serious diseases. I am not prepared to say, if specific treatment with tuberculin or its many derivatives would make any impression on the tuberculous process of the sinuses. No author mentioned it, and I have reason to doubt its efficacy in our affection, as their action is principally confined to the elimination of the tubercle bacilli, which were only found in a minority of the cases, whilst they do not influence directly the conditions due to the extension of the process. The same will hold good of the opsonin-tuberculin method, so much in vogue now in England. But in these desperate cases, I would not hesitate to use all the means at our command, and give a thorough trial to the specific treatment, to which I feel encouraged by the favorable results observed in uncomplicated nasal-tuberculosis.

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THE ACOUSTICS OF THE MOUTH AND THE RELATION OF THE INDIVIDUAL'S VOICE TO HEARING.*

BY D. BRADEN KYLE, A. M., M. D., PHILADELPHIA.

Much has been written from a physiologic standpoint concerning the speaking and singing voice. Such writers and investigators as Mueller, Helmholtz, Gradenigo, Hensen, Gruber, Bezold, Spear, Bonnier, Rossback, Merkel, Cohen, Makuen and Mackenzie have added much to our knowledge of the mechanism of phonation and hearing. Yet, after all, while a thorough knowledge of the normal condition is essential, the various *methods* used in training the voice are necessitated by pathologic alteration involving some portion of the speaking tract.

The *normal* condition would only require *training* in executing, while the *pathologic condition* causes *straining* in execution. The anatomy and physiology is, of course, important, yet if all the tissues and parts were normally formed there would be little difficulty in training the human voice, but in the majority of cases there is some deviation from the normal which interferes with the regular mechanism of the apparatus of phonation. It is with these irregularities or pathologic conditions that we purpose to deal. It is of the greatest importance that the teachers of elocution and music should thoroughly understand these irregularities and the very fact that *different* teachers *strongly* and *urgently* uphold different methods proves the existence of such irregularities. If the formation of the vocal apparatus was always normal there would be no necessity for methods. This explains why some methods are successful in some individuals and failures in others.

The method, then, should be adapted to the individual case and not the individual case to the method. The use of the facial muscles in a variation of tone is merely the power to expand the walls of the building, increase the volume and lessen the resistance of tone. The power to depress the tongue and throw it in any position desired voluntarily lowers the floor of the building, increases the space of outlet and enables the individual to have a larger compass of voice.

Voice production requires the use of a complicated mechanism, i. e., the so-called musical ear. Through conscious or unconscious

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cerebration there is called into action for voice production three anatomical factors—the lungs, the larynx and the resonance tube. The resonance tube includes all structure above the vocal cords, which includes the vestibule of the larynx. The pharynx, the tonsils, the posterior nares, the anterior nasal cavities, the accessory sinuses, especially the antrum of Highmore, and the mouth. It is this resonance tube that after tone is produced modifies or aids the fullness, the smoothness, the roundness, the power, the sweetness and beauty of the voice. It is in this tube that the sounds produced in the larynx are re-enforced and it is in this same resonating tube that these sounds may be distorted and converted into rasping, disagreeable tones.

Now, if the three essential anatomical factors, namely, the lungs, larynx and resonating tube, are proportionate then the tones coming from the larynx, being modified by the perfect resonator, unite and modify each other. If, however, there is any disproportion this resonator acts as a distorter of sounds. It is like a tenor string on a bass violin, it is a misfit. If all parts work harmoniously that individual is gifted with a natural voice and is a natural singer, requiring only careful education and practice to make perfect execution, but when such harmony does not exist, where diseased conditions or imperfectly developed parts in the voice apparatus do exist, it is then that the teacher of music must differentiate the condition, as one will require a *method* and the other merely *execution*.

Volume, tone and timbre are controlled by the size of the lungs, the larynx and the resonance tube. Their loss then may result from (1) disease of the lungs, bronchia or trachea; (2) the larynx, with its innervation, not only local lesions, but lesions elsewhere; (3) diseases of the pharynx and tonsils; (4) diseases of the nose, including septum and antrum.

Each voice has its individuality, in fact, our voice is a part of our individuality. Tone production, timbre or quality and resonance together with execution do not repeat themselves in the same manner in two individuals. This is especially marked in singers.

As to the question then of the acoustics of the mouth in its relation to the voice, the upper part of the resonating tube—the mouth, the tongue, the hard and soft palate, naso-pharynx, nostrils and accessory cavities bear the same relation to the voice as the building does to the speaker. The voice may be produced correctly, but its quality lost in faulty acoustics.

The building may be beautiful architecturally, but its acoustic properties poor. The decorator may improve the acoustics of the building, so may the laryngologist and rhinologist improve the acoustics of the mouth by correcting faulty conditions that interfere with perfect resonance. For example, the removal of enlarged tonsils, naso-pharyngeal growths, correction of nasal obstruction, etc. Again, in some cases, certain pathological conditions may improve the acoustics. One of our famous singers has abnormally large tonsils, in fact so large that when the tongue is protruded and the muscles of the larynx made tense, the tonsils project so as to meet in the median line; yet, when that individual sings, by depressing the tongue the tonsils fill into the lateral cavity of the pharynx, the patient having an unusually wide pharynx with concave walls. In this position, then, the tonsils offer no obstruction to sound in the resonating tube, while the removal of these tonsils would entirely alter the walls of the building and would also alter its acoustic properties.

An advantage of the mouth as a part of the resonating tube and its relation to acoustics is that the soft parts, namely, the cheeks and the tongue can be placed in various positions at will, so that the walls of the building can be expanded or contracted and the floor of the building elevated or depressed at the will of the individual.

The relation of the voice to hearing and the control of the voice by hearing presents an interesting subject for discussion and study. *Voice* is not *hearing*; we also have voice in the absence of hearing, yet *hearing* is really the *controlling* element in the production of voice. The relation of our own hearing to our individual voices is illustrated in our speaking and in singing. Our voice to us is what our ears indicate.

As to hearing, this necessitates two classifications, namely, *subjective* and *objective* hearing. By subjective hearing we mean the individual's subjective sense of sound-perception; in various lesions of the ear with the various noises heard by the patient, that is subjective; his sense of sound-perception of his own voice is subjective. However, in noises of the ear, which are usually only heard by the patient, we can form no comparison, because the observer cannot hear the noise. As to his own voice, we can compare his subjective sense of sound-perception with that of the observer. The individual's subjective sense of sound-perception is determined purely by external sounds. As to whether this is normal or ab-

normal he can easily determine by comparison with the external objective sense of sound-perception of others.

The training and cultivating of the voice under the guidance of a teacher, to be sure, is a great factor in the success of the individual as to his speaking or singing voice; however, one of the greatest difficulties the instructor often has is to convince the pupil that his voice is wrong. The pupil's own ears tell him that it is right. Many of you probably are aware that one of our greatest singers has one note which to that individual's ears is in perfect harmony, but which in reality is one-half tone flat.

A musical ear does not always mean a musical voice. Some individuals cannot sing or play and, as far as the music is concerned, could not tell "Yankee Doodle" from "Old Hundred;" yet the slightest discord in the human or orchestral tones will be detected instantly by such a person's hearing.

Again, certain individuals may have a musical voice as far as conversation or speaking is concerned, I say musical, meaning a pleasing tone, yet such individuals cannot sing and their ear will not tell them whether they are in chord or dischord. If, however, they are attempting to sing with others their ear will tell them if the voices do not harmonize, yet they cannot control it, as their ear does not seem to indicate to them that fineness or distinction of tone which permits of harmony.

The alteration in the individual's voice where the hearing has become defective is so marked as to become almost characteristic, although there are exceptions to this. I have seen a number of cases in which the patient was so deaf that he could not hear conversation even in the very loudest tones, yet there was practically no alteration in the voice, but this is, indeed, the exception.

The deaf and dumb may be taught to speak, yet the voice produced is unnatural and not altogether pleasing. The hearing, then, associated with the voice acts as a regulator; defective hearing may mean altered voice.

It often falls to the lot of the laryngologist to examine the throat of singers or would-be singers, and many times the instructor of music, having used all his methods and means to train a certain voice, finally appeals to you to determine what is the matter. The pupil is thoroughly convinced that he can sing, and to his ear he can sing, but, unfortunately to the nine hundred and ninety-nine listeners, his subjective sense of sound-perception is faulty. These cases are, indeed, pitiful. I do not mean that we do not have some cases who think they can sing in spite of their hearing and voice. These facts must be taken into consideration by the elocutionist and the teacher of music.

Another extremely interesting fact illustrating the relation of the voice and hearing is this; in the first place, few of us could accurately describe our voices so that the voice would be recognized by any one else. Frequently we hear individuals discuss voices, either speaking or singing, and while seven out of ten might agree that the voice was pleasing, melodious, soft and sympathetic, and possessed the many other attributes necessary in a successful singer, yet the remaining three of the ten would find fault, some rasping note, something not pleasing, showing that the objective sense of sound-perception varies greatly in individuals. Frequently individuals are criticised for their loud tone of voice. Individually they may be charming, but their loud tone of voice frequently attracts attention. Did it ever occur to you that this individual himself did not know that he was speaking in such a loud tone of voice? I know this is true, as I have interviewed several such persons, who had been taken to task for their loud tone of voice. When I would have them lower their voice to an ordinary pleasing conversational tone, they assured me that to them it sounded as though they were speaking scarcely above a whisper, showing that their ears for their own voice were not so sensitive as for outside sounds. In such individuals the subjective sense of sound-perception was decreased or below normal, while their objective sense was normal. On the other hand, some individuals who use a quiet, soft, low tone of voice, to their own ear it sounds as if they were speaking in a very loud tone of voice. In such individuals their subjective sense of sound-perception is extremely sensitive or exaggerated. Just as objective sense to sound may vary, so does the subjective sense vary.

The effect of drugs and stimulants also illustrates the peculiar relation of the individual's voice to hearing, in that certain drugs or stimulants may exaggerate the two conditions which I have just described. The man with the defective loud voice talks louder and the man with the defective low voice finally speaks so low that you can scarcely hear him.

The jerky, irregular voice of deaf person is another index or evidence of the peculiar relation of the voice and hearing. Without hearing, of course, there is no sound, but the voice is more than sound, and the voice to the individual or rather the individual's voice to himself, is exactly what his ear tells him it is, and if there is any loss of harmony between these two, then he will have defective voice, yet in response to all the tests of hearing he shows normal reaction.

A few days ago, in training a young man, whose voice had not changed at puberty, and finally by the use of the falsetto voice I had worked him down to a perfectly natural tone and after having him speak in that one for a few minutes his face assumed an anxious expression and he said, "Will that be my natural voice?" for to me it sounds frightfully strange and unnatural. His ear had not been trained to that sound.

Pathologic alterations of the structures of the naso-pharynx, whether due to local or systemic changes, will produce subjective and objective alterations in the sound-perceiving apparatus. The objective one can be determined by tests, while the subjective ones can only be described by the individual. The tinnitus associated with any such alteration, no matter what form it may assume, is heard only by the individual, except in rare pulsating cases, and it cannot be detected by the observer, although frequently subjective sounds are so intense that the individual thus afflicted can scarcely realize that the sounds cannot be heard by the observer.

The involvement of the apparatus of subjective sound-perception, especially of the inner portion or the orifice of the Eustachian tube, will give to the patient the sensation of altered voice, common in singers. To the audience their voice is in perfect form, while to their own ear the voice sounds muffled, in other words, the subjective perception is interfered with, while the voice is in perfect form. At the same time, this individual may not show any defective objective sound-perception. In objective sound-perception the external ear is the collector of sound, while the drum membrane and ossicles of the middle ear are the transmitters of sound; in subjective hearing, this condition is partially reversed, the Eustachian tube partially taking the place of the external ear.

Sound is what we hear; our perception of sound depends on whether it is subjective or objective and our description of sound will depend on the condition, subjective and objective, of our sound-perceiving apparatus. The deaf-mute has no conception of perception of either subjective or objective sounds.

Voice is sound, speech is voice in action; the impression made by voice and speech will depend entirely upon the condition of the sound-perceiving apparatus; to the individual himself it will be both subjective and objective, but to the listener it will be entirely objective. The impression given to either speaker or hearer, will depend upon the acoustics of the mouth and the condition of the subjective and objective hearing of the individual.

1517 Walnut St.

SUBPERIOSTEAL SQUAMO-MASTOID ABSCESS, WITH SOME OBSERVATIONS ON THE ANATOMICAL DEVELOPMENT.*

BY SEYMOUR OPPENHEIMER, M. D., NEW YORK.

The development of a soft, more or less fluctuating mass over the region of the mastoid process of the temporal bone and accompanied with an outward projection of the auricle, is far more frequent under the age of three years than at any other period of life. Its not infrequent presence at this time resulting from the anatomical configuration of the temporal bone; in part from the extent of the primary suppuration in the tympanic cavity and often the factor of neglect plays a prominent role.

From an etiological aspect, various forms of subperiosteal pus collections over the mastoid process may be differentiated, and while it is desired here to consider that variety dependent upon an imperfect closure of the squamo-mastoid suture, yet it will be advisable to briefly mention the other factors concerned in the development of such pus collections. With but one exception, that of primary mastoid periostitis which must be considered as extremely unusual, subperiosteal abscesses over the region of the squamo-mastoid suture invariably result from the extension of pus collection in the tympanic cavity. Most frequently the route of the extension is by way of the antrum, the mastoid cells being involved to a greater or less degree, dependent upon the extent of the pathologic changes. In this form, the subperiosteal abscess represents the direction of the pus flow in the line of least resistance and also the accumulation of purulent material which is in excess of the cellular spaces represented by the tympanic cavity, antrum and pneumatic spaces of the mastoid process. In the young child, one almost invariably finds that the pus exit through the osseous tissue behind the auricle, is either directly through the fissure in its close relationship to the antrum, or in essential proximity to it, while in the individual at a later age whose mastoid process has fully developed, this is not so frequent as it is not at all uncommon to find a sinus at some other location over the external surface of the mastoid.

* Presented at the Thirteenth Annual Meeting of the American Laryngological, Rhinological and Otological Society, New York City, May 31, 1907.

In another variety of this form of mastoid abscess, the laying back of the soft tissues over the pus collection, will fail to disclose even on most minute investigation of the bony cortex, any microscopic evidence of sinuses or dehiscences in the bone, either in relation with this fissure or not, that will account for the presence of pus in this region, apparently separated from the middle ear and antrum by varying thicknesses of healthy osseous tissue. In such cases one will find, however, by microscopic examination of portions of bone removed at operation, that the infection has been transmitted from its primary focus in the tympanic cavity by direct paths via the blood and lymphatic channels; the minute vascular channels especially, perforating the bone from the interior to the exterior and thus intimately connecting the mucous lining of the spaces within, with this periosteum of the exterior of the mastoid process.

As a result of infection of the lining of the external auditory canal, either generalization or more especially when pus is produced in a localized form such as a furuncle, and extension of the infection posteriorly may take place with the development of a superficial abscess over the mastoid process and closely simulating that produced by the escape of pus through the squamo-mastoid suture. Such a condition, however, is not usually accompanied with middle ear suppuration, the abscess is more apt to involve the subcutaneous cellular tissues rather than the periosteum and evacuation will disclose that the mastoid cortex is normal and free from fistula.

Without other sources of infection, it is also possible to have a subperiosteal mastoid abscess from primary infection either of the mastoid cells, or the periosteum covering the cortex, but such initial infections are rare and their etiological diagnosis always admits of considerable doubt, so that it will not be necessary to consider this variety of infection.

The mechanism of the extension of purulent material from the tympanic cavity to the exterior of the osseous mastoid process through the squamo-mastoid fissure, depends on many variable factors, of which the most important is the partial patency of the fissure and an increased resistance to the escape of pus in other directions, especially through the tympanic membrane. As regards the opening through the mastoid cortex, it seems to be a well established rule that the fistula is directly over or in very close relation with the antrum, as this portion of the osseous wall is thinner, often dehiscient in part and in the child, the class in which this form of abscess is most frequent, the covering here is often but barely thicker than a piece of paper.

As will be referred to later, the squamo-mastoid fissure undoubtedly bears a rather close relation in this respect, as in the young child the union between the two segments of bone here, is but partial and filled in with soft connective tissue, while in the child of later years and the adult, more or less incomplete osseous union along the entire course of the fissure exists in a considerable number of individuals. The breaking through of the pus at this point in such cases where the fissure still remains incompletely closed, presents an aspect of considerable practical interest, for at this point one finds the site of election for opening the antrum and mastoid cells not only in these cases, but in the general operation of eviscerating the mastoid process, so that in operating in such cases one can readily perceive the advantage of following the opening in this situation to the original source of the primary pus collection.

While a perforation of variable size may exist in the tympanic membrane either in acute, or chronic tympanic suppuration, yet the excessive amount of pus produced in some cases will be such that free and rapid exit is not afforded by this channel and a certain amount of purulent material will find an exit through this fissure, although objective examination will show a profuse discharge filling the external auditory canal. More frequently, however, the resistance in direction of the external canal is increased in acute cases by the thick tympanic membrane of the young child and the direction for easiest access for the pus to escape to the exterior, is by way of the patulous squamo-mastoid fissure. In chronic cases where the drum membrane is in greater or less part destroyed, the obstacle to the free flow of the secretion is generally some obstruction in the neighborhood of the margo tympanicus, such as granulation tissue, inspissated pus, debris, etc.

While, as before mentioned, both in children and adults, the direction of least resistance for the escape of the pus flow may be through the fissure, yet in a not infrequent portion of cases of subperiosteal mastoid abscess in very young children, the abscess may lie over this region and yet the purulent material has escaped from the tympanic cavity by dissecting away the periosteal lining at the inner end of the external auditory canal, at its superior and posterior borders, and thus producing a free exit of escape into the soft tissues behind the auricle. Under these circumstances, destruction of bone is frequent, while in cases where the pus finds its way externally through the squamo-mastoid fissure, necrosis to a greater or lesser degree is almost always found on operation.

When pus escapes externally through the squamo-mastoid fissure either from a simple middle ear suppuration, or one in which the mastoid cells are also involved, it does not necessarily follow that the external evidence of a subperiosteal abscess will be most marked over the location of the fissure, as in some instances, although rarely, it will show the greatest swelling above the mastoid process, as the pus will burrow upwards and collect in the parietal region.

The anatomical relations of the squamo-mastoid suture are such when it is incompletely closed, that it readily affords an almost direct communication between the middle ear and its adnexa, with the exterior of the mastoid cortex and thus provides a ready means of exit for any profuse discharge in the former region. In the very young child, the temporal bone is more or less loosely connected by various sutures which have not completely united by osseous tissue, but are held together by fibrous connective tissue, so that should any portion become infected, the further spread of the infection from its original source is thus greatly enhanced and purulent material thus formed, may readily pass from one part to another along the lines of these sutures.

This fissure forms the line of conjunction of the mastoid process with the external squamous plate of the temporal bone, so that in some specimens it forms a well defined gap between the early mastoid process and the horizontal portion of the squama. In the new born, the mastoid process is but a rudiment of the process in the adult, although at this early age its outlines are often well formed; even in the embryo the shape of the future mastoid process is fairly well performed and bears a definite relation to the groove under discussion. In the new born, this process is represented by a small tubercle posterior to the upper portion of the annulus tympanicus, so that during the first year, as the mastoid process becomes better developed and thus more clearly defined, it assumes a much lower position, and the squamo-mastoid suture bounding it anteriorly at the same time becomes less clearly defined in the majority of instances.

Inasmuch as the mastoid process is formed through the union of two portions of the temporal bone, the squamous and petrous portions each constituting a part, the squamous being in front and above the latter, it follows that the line of junction of these two parts is most conspicuous on the external surface of the mastoid process and thus constitutes this suture or fissure, which has such a prominent surgical interest in certain cases of subperiosteal mas-

toid abscess. In the majority of specimens examined, the suture extended from the anterior border of the mastoid process, a short distance above the tip in a direction upwards and backwards, and usually followed a line more or less parallel to the posterior border of this process.

In a few cases it is very apparent that the mastoid process is developed at the inferior anterior part of this fissure and as far as the temporal bone of a child a few months old is concerned, as this fissure is most important pathologically in the child of an early age, it will be found in quite a number of instances, that the outer surface of the mastoid shows this fissure as a bony deficiency at its anterior and superior edge. Although in some cases even at this early age the fissure is not at all well marked and one can recognize its location only by a series of irregular semi-openings at this location, varying in size from two to three millimeters in diameter, thus showing that the line of osseous union between the squamous portion and outer mastoid wall was well advanced. In such cases as these, the development of a subperiosteal abscess by this route being almost an impossibility, the mastoid cortex by preference being perforated in other and less resistant locations.

In the new born, therefore, the squamo-mastoid fissure can generally be recognized as an irregular depression lying between the anterior surface of the tuberculum mastoideum and that part of the posterior portion of the pars squamosa which forms the external wall of the so-called mastoid antrum, although, it is always well to bear in mind that this latter cavity is anatomically a part of the tympanum and not of the mastoid process. As the child grows older and about the end of the first year, the osseous union of the temporal bone in its various parts begins to be fairly well completed in the average cases and thus union taking place, this suture becomes more or less obliterated, but often leaving behind some well marked traces of the former separation in this location. By the end of the first or second years, the suture in the majority of individuals has entirely disappeared, although, as before stated, in a small number it may persist even in the adult, showing as a jagged, somewhat deep, irregular furrow at the line of union of these portions of the temporal bone.

Following along the lines of development of the temporal bone, it will be found that some portions unite at a much earlier period than others and in relation to the anatomical configuration of this fissure, it will often be found that the antero-superior and the pos-

terior parts of the tympanic ring together with the inferior portions of the posterior process of the horizontal portion of the squamosa, unite by osseous union at a much earlier period than the other portions of the bone in this location and also of the neighboring osseous tissue, so that while in some instances the peripheries of the squamo-mastoid fissure will be firmly united, the central portion will remain more or less dehiscent, being filled only by soft connective tissue, the other portions of the fissure being more or less completely obliterated by the firm osseous union.

Returning again from the child to the adult type, it has been found that the squamo-mastoid fissure is quite extensively opened in about three per cent of all temporal bones examined and the usual specimen will show it as a more or less complete fissure running in an irregular zigzag manner from a position posterior and superior, in a direction inferiorly and anteriorly. Or, in other specimens, it will be found to consist of a series of small, irregular clefts or foramina arranged along the line of location of the fissure. While again in another class of temporal bones, these partial openings are invisible from their filling up by osseous tissue and the position of the fissure can only be located by an irregular rough line separating the smooth antero-superior portion of the pars squamosa, from the rough and irregular true mastoid portion of the temporal bone lying posteriorly and inferiorly. So that irrespective of whatever variety of temporal bone exists as regards this suture, it will be found in the great majority that while it plays no part in the formation of a subperiosteal mastoid abscess, yet it is recognizable in the adult although but a trace of it remaining.

From the studies made by Kirschner on the skulls of thirty children and three hundred adults, he found the squamo-mastoid suture existing either perfectly or partially in the majority of cases and on both sides of the head. If it was found to be most marked on one side, then this occurred most frequently on the left, while as regards its presence as related to sex and age as a factor, no appreciable difference was ascertainable. Although he found it present in the skull of an individual eighty-three years old. It was also found as a result of these important studies, that when the squamo-mastoid fissure was well marked, the thickness of the mastoid process from without inwards, was less in proportion to its breadth and height.

As regards the relation of the soft tissues concerned in the development of a subperiosteal pus collection and this fissure, it will be found that in such cases where this condition develops from an

original middle ear suppuration, that the infection does not spread directly through an open fissure, but that the suture is irregularly closed with connective tissue and periosteum. The infection of this tissue necessarily preceeding the development of pus under the dermal surface covering the mastoid process. These soft tissues containing blood vessels form a continuous line of relationship between the tympanic cavity and the osseous exterior, as they practically represent both from an anatomical and surgical aspect, the continuation of the lining of the tympanic cavity and mastoid cells with the periosteal covering of the surface of the latter.

The development of this form of abscess in relation to the pathological changes in the mastoid and middle ear, presents several features of marked importance, as when developing in connection with marked mastoiditis, one usually finds that the interior of the mastoid process is occupied by one or more large sequestra in the chronic cases, although even in instances when the aural affection has been of but comparatively short duration, even lasting but a few weeks, a large portion of the bony structure may be entirely separated from the surrounding tissue. This condition of extensive necrosis and caries, is mostly apt to follow diphtheria and scarlet fever with secondary aural infection. While in cases where these acute infectious diseases are not directly concerned in the etiology of the aural suppuration, it will almost invariably be found that such extensive osseous destruction occurs in cachectic individuals, such as children with a tuberculous taint, or poorly nourished, or subsequent to long continued illness of various types.

Not only in such cases does the destruction involve the common seat of predilection, that surrounding the antrum, but the squamous portion of the temporal bone undergoes partial disintegration especially in the neighborhood of the squamo-mastoid fissure, so that this portion of the bone may be converted into a deep and wide opening through which pus escapes to the exterior. While subperiosteal squamo-mastoid abscess is most frequently found in the so-called strumous type of child, this cause is most frequent from the third to the seventh and eighth years of life, as in the infant it may follow any form of suppurative otitis media, even in an otherwise healthy individual. In the latter type, the brunt of the primary infection is borne by the tympanic cavity, while in the tubercular or strumous individual, the pathologic changes are more frequently of greater severity in the antrum than in the former cavity, as a result, I believe, in such cases of the drainage being obstructed at this

point; the tympanic secretion being readily drained off through the external auditory canal.

Undoubtedly this form of abscess occurs most frequently in the very young child as a complication, or termination of acute suppurative middle ear disease, and while in a not inconsiderable number of instances the infection extends by way of the squamo-mastoid fissure, yet in other cases which must be differentiated, it may be secondary to an otitis externa which has followed or accompanied the tympanic suppuration and as a later sequence infection of the mastoid periosteum takes place with the breaking down of this tissue and the development of a subperiosteal pus collection, either with or without the escape of pus through this fissure.

When the suppurative process involves the lining membrane of the mastoid cells, the osseous tissue itself in a considerable number of cases may during the entire course of the affection remain perfectly healthy, the pus escaping through this suture, so that at no time is it confined in the interior of the temporal bone. In any of these cases, however, when an external periostitis develops and the pent up pus in the larger cavities of the bone is allowed to quickly reach the surface, the relief of the pressure obtained by the pus escaping under the soft tissues alters the pathologic changes going on in the cavities of the interior, as it practically amounts to a temporary evacuation of pus from its original confined site to another location where externally it is resisted by soft tissues instead of having on all sides bony walls, so that at this time in the course of such an infection, distinct relief to all the symptoms should such be present, is temporarily obtained.

In chronic suppurative otitis media in children, where treatment has been but desultory or the case has been entirely neglected, some portion of the mastoid cortex is sooner or later eroded and finally perforated. Whether the pus escapes in this manner or by way of the suture under discussion, the further pathological changes are identical in all instances, as an effusion then takes place beneath the mastoid periosteum at the point where the morbid process is most active; then the periosteum is dissected loose from the underlying bone by the inflammatory exudation and at a still later stage the pus collects in greater or lesser amounts under the periosteum, where it may remain more or less localized to a limited area, or even penetrate it and become infiltrated into the cellular tissues beneath the skin.

The structural conformation of the mastoid interior in relation to its anatomical development, bears a not inconsiderable part in determining the direction in which the pus will escape, as in the pneumatic type of mastoid where the cells are of considerable size and the cortex is thin, the pus is more apt to escape externally by perforating the cortex than in those individuals with sclerotic or diploetic mastoids. While in that form of subperiosteal abscess resulting from the escape of pus through the squamo-mastoid suture, the particular type of mastoid is in itself of little moment, as the opening of this fissure is sufficient to allow at least the partial escape of secretion, without producing a fistula in various portions of the temporal bone either internally or externally. But in spite of this, in children where the mastoid has sufficiently developed so as to assume the adult conformation, it is often found on account of structural peculiarities in the bone, that even with a free escape of pus under the cutaneous covering of the mastoid process, there is a considerable degree of necrosis, usually accompanied with the formation of a large sequestrum which is frequently surrounded by granulation tissue and pus.

A most important question concerning these cases is whether any danger of intracranial infection remains after the pus has forced its way beneath the skin covering of the mastoid process. That such a danger does exist cannot be denied, as the amount of pus escaping from the middle ear and mastoid cells under such circumstances, is always limited and in acute cases especially, the natural thickness of the membrana tympani in the child, still retaining its integrity in many cases, offers an added barrier in preventing the escape of pus through the external auditory canal. When the subperiosteal abscess is present, therefore, and the subjective symptoms have subsided, the danger of intracranial infection has not been eliminated, as the safety of the individual practically is dependent only on the small passageway presented by the suture and in addition to the danger of an area of caries developing in relation to the cranial cavity in children infection is also liable to take place by way of other incompletely closed sutures, or it may even result from pathologic changes taking place in the squamous plate. In very young children, however, the danger of such serious complications is greatly minimized on account of the structure of the temporal bone at this time, as the inner mastoid walls are thick and not only relatively but actually more resistant, while the cortex is the reverse; this being directly opposite to the condition as it occurs in adults.

Both in the child and the adult, the presence of a subperiosteal abscess is readily recognized by the swelling over the mastoid process, and if the pus accumulation has existed for any length of time, the tissues are red and oedematous with more or less accompanying pain. Pressure upon this form of abscess will always cause the pus to flow from the external auditory canal if a perforation exists in the membrana tympani and in a not inconsiderable number of cases especially in children, symptoms of general sepsis develop at an early period. It should always be remembered, however, that in some instances the pus may escape through the fissure without pain or other symptoms, so that the first indication that the condition exists is the discovery that the auricle is projecting forward and that there is a swelling over the mastoid process.

Finally, as to the area covered by the abscess. This will depend to a great extent upon the attachment of the periosteum to the bone and while as a rule the periosteum is more loosely attached in an upward direction over the squamous portion of the temporal bone, than inferiorly towards the tip of the mastoid, the pus usually dissects up the soft tissues in this direction at first, so that as a rule one finds the bulk of the abscess situated above and behind the auricle. And as the periosteum is firmly attached to the osseous tissue at the junction of the various sutures, its limits are usually sharply defined by these anatomical boundaries.

45 East 60th St.

FOUR MASTOID CASES.*

BY NORVAL H. PIERCE, M.D., CHICAGO.

CASE 1. *Operation for Chronic Suppurative Otitis Media without Removal of Membrana Tympani or Ossicles.* Man, aged 20, had measles at 7, following which both ears discharged, resulting in chronic suppuration. The right ear has been dry for a number of years. The left ear continued to discharge, profusely at times, and there has been pain over the mastoid region. The discharge was purulent in character and came from a small perforation in Shrapnell's membrane, the pars tensa being intact. He could not hear a whisper and a conversational voice only at two feet in the left ear. The right ear is also affected. On December 26th last, the mastoid antrum was opened and the external auditory canal taken away down to the annulus. The aditus ad antrum and surrounding cells were found filled with a cholesteatomatous mass of tissue intermixed with pus. When this was cleaned out up to the healthy bone, a cavity the size of a filbert remained. The tympanic membrane and contents of the cavum were not disturbed. A very careful examination disclosed no caries of the ossicles. A reverse Stacke flap was made from the external auditory canal and turned into the cavity; that is to say, as the Stacke flap covers the floor of the cavity, left after a radical operation, this that I made covered the roof and was packed in position. The posterior incision was closed; drainage was carried into the external auditory canal, and a wet fifty per cent. alcohol dressing put on. The posterior incision healed, as you see, by primary union. The cavum is now dry, likewise the antrum. There still remains a perforation in Shrapnell's membrane. The man can hear eight feet for voice, and two for a whisper in the left ear.

This operation is especially indicated in cases where there is only perforation of Shrapnell's membrane and the pars tensa is intact, or where there is only a small peripheral perforation in the pars tensa. Where there is extensive destruction of the tympanic membrane, and the ossicles are necrotic or bound down by adhesions, there is little gained in stopping short of a complete radical operation. In certain cases it will be found impossible to perform this operation, especially in those in which the chronic discharge is kept

* Read before the Chicago Laryngological and Otological Society, February 19, 1907.

up, not be a large cavity in the mastoid process, but by a fistulous tract, or where the antrum and aditus are reduced in size by plastic inflammation, or even obliterated, we must, after our attempts at reaching the antrum have proven unsuccessful, resort to the Stacke procedure of following up from the middle ear. There was two methods by which it may be performed. *First*, in the manner illustrated by the present case; *second*, by taking away the external wall of the epitympanic space also, yet leaving a rim of bone to hold the tympanic membrane. Attention has been drawn to this operation by a recent article written by Heath, but it is not a new procedure by any means. The results, so far as hearing is concerned, are more successful than those obtained by the complete radical operation, but it is only suited to selected cases.

CASE 2. *Acute Otitis Media, Mastoiditis, Abscess of the Neck.* Adult woman, admitted to the Policlinic with acute otitis media and mastoid involvement, with swelling at the tip, and a temperature of 102°.

January 13, 1906, the mastoid process was taken away and the anterior zygomatic cells thoroughly cleaned out. Two days afterwards a large abscess appeared in the neck, accompanied by a rise of temperature to 103°. It rapidly invaded the deep tissues of the neck, and was opened just an inch above the sternum at the point marked by the present scar. Two weeks later the swelling developed on the side of the face. A drainage tube was inserted below the jaw at the point marked by the second scar. The patient was markedly septic; slight facial paralysis gradually came on, together with torticollis, which drew the head well to one side. You see now a woman in perfect health, with full movements of the facial muscles, and no torticollis. Massage of the sterno-cleido-mastoid muscles on the affected side will hasten the disappearance of these conditions which result from suppurative processes in the muscles themselves.

CASE 3. *Facial Paralysis following Cholesteatoma with Mastoid Operation. Partial Re-establishment of Function after Three Years.* This little girl was operated on when five and a half years old, for an enormous cholesteatoma in the left ear. Complete facial paralysis followed immediately after the operation and existed for four years. At the time of the operation I was convinced that the sequestrum which had formed in the deeper portions included the facial nerve. Three years ago the facial muscles began to show reaction and, as you see now, the patient can use the muscles quite

well, closing the eye perfectly. This case illustrates one of two things, either that the nerve is capable of regeneration after a very long time, or that nervous impulses may be carried to the facial muscles through channels outside the trunk of the facial, most probably through the hypoglossal.

In Seppy's Anatomy there is an illustration portraying a branch which goes from the peripheral portion of the facial to the hypoglossal. That this anastomotic action may take place is proven by a case reported by Bezold in which the sequestrum taken from the ear enclosed the facial canal.

CASE 4. *Acute Mastoiditis, Operation with Repeated Sloughing of Wound. Hysteria?* A girl, 16 years of age, was sent to me from Las Vegas, New Mexico. One year ago she had some work done on her tonsils. Three months afterwards she complained of pain in the right ear and over the mastoid region. On inspection, the membrane was found congested. Paracentesis was performed without result. Her condition continued for about a month, when the patient was placed in charge of another doctor. During the first part of July the temperature arose to 100°, with infiltration and tenderness over the mastoid. Her physician did a simple mastoid operation, finding softened bone with some pus. The wound healed kindly, and the patient did well, until September, when the mastoid again became infiltrated and tender. Another opening was made, and an immense amount of semi-necrotic bone, with a small amount of pus, was removed. The temperature then was 100.5°. Patient did well for two or three days, when she complained of pain and became unconscious at each dressing, but occasionally between times remaining for a few minutes, once for eleven hours, unconscious. The return of consciousness was marked by a jerk. After the last operation, while the wound seemed to fill in, it became gangrenous and sloughed. In October she was again operated on, and only granulation tissue was found. The wound healed kindly, but when practically closed, without any warning, the wound sloughed out and became gangrenous. It resisted all treatment; the bone became exposed, and unconscious states have continued up to the present time. There is now a punched-out hole behind the ear. The space is white, with a sprinkling of blackish spots. The white base is made up of a layer of carious bone. If this is scratched, bleeding of the vessels beneath takes place. About the edges of the wound is a slate-colored slough, with a narrow rim of periosteum, the neighboring soft tissues being slightly involved. The skin is not in-

filtrated, but is macerated from the discharge issuing from the wound. There is no active suppuration, and there is marked anesthesia of the scar and surrounding tissue. I have examined the patient carefully for the stigmata of hysteria and find the classical symptoms all present. She has complained at times of blindness in the right eye, coincident with the exacerbations occurring in the mastoid wound. Syphilis, tuberculosis, carcinoma, may, I believe, be excluded in this case. As the wound began to change in character and showed signs of rapid healing, I have not taken away any of the soft tissues for microscopic examination. I believe that we have here a process which is connected in some way with the hysterical state. Whether it has been produced by the patient's efforts to arouse sympathy by the introduction of substances beneath the dressing or not, I am unable to say, but the fact remains that under suggestion the wound is rapidly healing.

725—31 Washington St.

The Use of Suction in Middle Ear Disease. SONDERMANN. *Arch. f. Ohrenh.*, Dec. 1904.

Suction is applied to the middle ear by means of an apparatus devised by the author. It consists of a mask which fits on the side of the head, around the auricle, and which is connected with a rubber bulb. The air in the mask is rarefied and the secretions contained in the tympanum are drawn out by suction. The apparatus is applied by the patient himself after each irrigation. If the patient swallows while the apparatus is in place, air enters through the Eustachian tube, and a sort of Pollitzerization is performed. The author claims that the apparatus is a useful addition to treatment.

YANKAUER.

A CASE OF FOREIGN BODY IN THE LARYNX FOR TWO YEARS. THYROTOMY. RECOVERY.*

BY SYLVAN ROSENHEIM, A. B., M. D., BALTIMORE.

This case is of especial interest for two reasons, first the toleration of the larynx, the foreign body remaining there for two years, and secondly the almost perfect result following the operation. From the moment the patient swallowed the foreign body, a button hook from a shoe, until the operation, he was unable to speak above a whisper. He now speaks very distinctly, the voice is, however, slightly husky.

The patient, a boy aged seven years, was seen first by the writer at the Johns Hopkins Hospital Dispensary in June, 1904.

COMPLAINT. Difficulty in breathing. Choking spells. Inability to speak above a whisper.

FAMILY HISTORY and **PAST HISTORY** unimportant.

PRESENT ILLNESS. Two years ago the patient swallowed the hook from a shoe. Since that time he has not been able to talk above a whisper. He was brought to this dispensary, the mother states, a number of times, but nothing was found. For the last six months he has had attacks of dyspnea and choking at night, which often last for five minutes. He is not bothered in the daytime. During these attacks he gets blue in the face and sometimes spits blood. He breathes very heavily now and with considerable effort. At night he breathes through his mouth.

PHYSICAL EXAMINATION. There is marked stridor on both inspiration and expiration. The tonsils are enlarged and adherent to the anterior pillars. Adenoid tissue in the naso-pharynx enlarged.

Larynx. The epiglottis, arytenoid bodies and aryepiglottic folds are perfectly normal. The rest of the larynx is filled up by a large irregular swelling, which involves principally the place of the right true and false vocal cord. It is of a reddish hue, the surface has a granular appearance. At the first examination it was noted that this was probably a mass of granulation tissue surrounding the foreign body. The left ventricular band is also swollen, concealing the true cord. It also has an irregular granular appearance. The ap-

* Read before the Johns Hopkins Medical Society, February 4, 1907.

pended diagram gives an approximate idea of the laryngeal appearance.

The patient was admitted to the Hebrew hospital and operation performed May 24th by Dr. R. H. Follis and the writer. On admission his temperature was 99.8° , pulse 100, respiration 26. He was slightly cyanotic and there was some stridor on respiration. He was unable to speak above a whisper.

Examination of the chest showed indentation of the infraclavicular fossa and the lower part of the sternum. Rachitic nodules are present on the ribs. Otherwise the chest is normal.

OPERATION. Low tracheotomy; Thyrotomy, Removal of Foreign Body and Granulation Tissue about it. Chloroform Anaesthesia.

After the performance of the tracheotomy, the skin incision was carried up to the level of the hyoid bone. The superficial tissues



Fig. 1. Appearance of Larynx before Operation. x Narrowed Glottis.

were next cut through down to the thyroid cartilage which was severed with the bistoury in the mid line. The foreign body immediately appeared in the opening. The button hook was black, eroded in places, and had the offensive odor of necrosis observed in a decaying tooth. A mass of grayish white tissue was removed from the larynx with scissors, mostly from the right side in the region of the ventricle.

The thyroid cartilage was then sutured with silver wire, the muscles brought together with silk sutures and the skin united by interrupted silk sutures.

The day following the operation the patient's temperature rose to 100.8° , and on the second day to 101.4° , following which there was a gradual decline to normal on the fifth day following the operation. Convalescence was interrupted only by the formation of

stitch abscesses and the healing of the wound by granulation. The tracheotomy tube was removed at the end of the first week. He was discharged from the hospital June 16th, 23 days following admission, with the wound almost closed. He then breathed perfectly freely and was able to speak in a loud whisper.

After a number of the silk sutures were discharged from the wound, it healed. The voice and general health of the patient have steadily improved. The tonsils and adenoids were removed some months after the thyrotomy operation.

Examples of foreign bodies fixed for any length of time in the larynx are very infrequent. They are usually expelled or drop down the trachea. Sometimes they cause immediate asphyxia. A few cases of retained foreign bodies are reported in the monographs of Poulet, Schaeffer and Schroetter. Moritz Schmidt mentions one

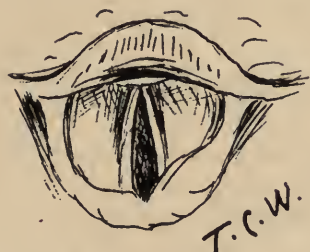


Fig. 2. Appearance of Larynx at Present.

case in which a piece of wood 1 cm. long remained in a man's larynx for eight years. It produced chronic hoarseness and was expelled spontaneously. Desault had a case in which a cherry pit remained for two years in the ventricle of the larynx. Watson reported a case of a gold coin remaining for years in the larynx without producing severe symptoms. Among 16 cases of laryngeal foreign body observed in von Schroetter's clinic up to the year 1901, the longest sojourn of any was three and one-half months. An interesting case of foreign body removed from the larynx after thyrotomy is reported by Morell Mackenzie. In this case the foreign body, a toy engine, passed into the boy's larynx during sleep. Tracheotomy was done and some months later the case was seen by Dr. Samuel Johnson, Dr. Mackenzie's assistant, who removed it after performing a thyrotomy. In this case the voice remained hoarse.

The fate of the foreign body lodging in the larynx depends upon its size, disposition, duration, and lastly upon the toleration of the patient. The initial attack of suffocation followed by coughing may result in its immediate expulsion. Or after staying a variable length of time it may be expelled. It may cause immediate fatal asphyxia. This occurs especially in cases where large particles of food lodge in the larynx, in old people or when there is anaesthesia of the larynx.

Schaeffer reports a case in which a chicken bone 3x1 cm. remained on the posterior laryngeal wall for 6 months, causing only a slight thickening of the parts. Usually, however, suppuration takes place. An ulcer forms, which may be superficial or deep, covered by a yellowish or diphtheritic exudate. Finally, granulation tissue forms, enclosing the body and holding it fast. In some cases the foreign body works its way externally, forming an abscess in the neck. Large vessels are sometimes eroded, causing fatal hemorrhage. Schaeffer mentions one case of cyst formation caused by a foreign body.

The diagnosis of a foreign body in the larynx is usually indicated by the anamnesis. The hoarseness, difficulty in swallowing and dyspnea point to it. If it is a sharp object, palpation externally will help to locate it. The laryngoscopic examination usually shows its position. However, if it is very small and lies in the ventricle of the larynx, it may not be visible. Or, if it has lain there for some time and has become surrounded by granulation tissue, its location cannot be made out. In such a case the Roentgen ray might be of value. In children and very nervous individuals laryngoscopic examination may be impossible. In such, direct inspection with the bronchoscope under chloroform anaesthesia should be tried or an exploratory thyrotomy at once performed.

The treatment of foreign bodies depends a great deal upon the facilities at hand and the expertness of the physician who treats the case. If the physician is at hand when the accident occurs he should invert the body of the patient, thus allowing the force of gravity to assist the coughing efforts of the body. An emetic may also be tried. As soon as possible the body should be located in one of the ways which have been mentioned and removal attempted, first under the guidance of the laryngoscope, if this appears feasible. Much has been accomplished recently with the aid of the bronchoscope in the removal of foreign bodies here and lower down in the respiratory tract.

In very young children and in cases of imbedded foreign bodies like the case presented to-night, thyrotomy would be the operation of choice. The objections advanced against this operation have been the fear of loss of voice and the mortality of the operation. However, if the incision through the thyroid cartilage is made in the mid line, thus avoiding the vocal cords, the results as regards the voice are very good, even in cases where a part or the whole of a vocal cord is removed. In fifteen cases in which Chevalier Jackson performed thyrotomy for intrinsic cancer of the larynx there was not a death as a result of the operation. He places his patients in the Trendelenburg-Rose position, uses chloroform anaesthesia and illuminates the field of operation with an electric head light.

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**CASE REPORTS. (a) EPITHELIOMA OF THE LARYNX:
TOTAL LARYNGECTOMY INCLUDING THE REMOVAL OF
PART OF THE TRACHEA. DEATH FROM PNEUMONIA ON
THE THIRTEENTH DAY.**

**(b) SARCOMA OF THE PHARYNX IN A CHILD OF EIGHT
YEARS, WITH AUTOPSY FINDINGS AND MICROSCOPICAL
REPORT.***

BY CLEMENT F. THEISEN, M. D., ALBANY, N. Y.

CASE A. This case is reported, because it emphasizes the point brought out by Delavan in a paper read at a meeting of this association (Recent advances in the treatment of malignant disease of the larynx, 1904), that early radical operation offers the only reliable prospect of cure in cancer of the larynx. It brings out another point so often raised by Mackenzie in discussions upon this subject, that microscopical diagnosis of cancer of the larynx is often difficult, and that the laryngologist may be misled by his pathologist, and valuable time lost.

There is no doubt, however, that the fault is often the laryngologists, for not cutting deeply enough into the growth when he removes a piece for microscopical diagnosis. It is well known that a laryngeal growth may not show malignancy on the surface, and still be malignant. This question has been so thoroughly discussed at meetings of this association that I will not go into it any further. I will say, however, that in my own case, it would have been better, and the patient would have had a better chance, if the radical operation had been performed just as soon as the naked eye diagnosis of cancer was made.

I *did* make that diagnosis, but when several pieces were removed for microscopical examination, and the report came back that the growth was not malignant, I felt doubtful of my diagnosis, and so lost much valuable time.

I have no doubt at all that the removal of pieces of the growth for examination, was probably responsible for the very rapid extension of the disease subsequently.

Mr. F. M., aged 57 years, was referred to me by his physician (Dr. Barnes, of Troy,), with the history, that for several months he

* Read before the Twenty-ninth Annual Congress of the American Laryngological Association, Washington, D.C., May 7, 8 and 9, 1907.

had been hoarse, but that his general condition had been very good. I first saw him last September. On examination, the nose, nasopharynx, and pharynx, showed practically normal conditions. On laryngeal examination, however, a rather flat, somewhat nodular, firm growth, involving about two-thirds of the left vocal cord, was seen. This presented very much the appearance of multiple, small, papillomatous excrescences. The left ventricular band was somewhat reddened and thickened, as was also the mucous membrane in the left arytenoid region. The right cord was slightly reddened, but was smooth and otherwise normal.

On October 3rd, several small pieces of the growth were removed with cutting forceps, and sent to the laboratory for microscopical examination.

The report came back that the growth was not malignant, and was probably of an inflammatory character. My original clinical diagnosis was carcinoma, but thinking that I must be mistaken, and after talking the matter over with his physician, we decided to use palliative measures for a time. There was no involvement of the cervical lymph nodes so far as could be determined.

The patient was under my observation for a number of weeks after this and improved somewhat. I then did not see him until January 14th of this year. He had been having considerable dyspnoea, and was breathing with some difficulty when he came into my office. The growth had extended very much in the interval, involving the whole left cord, extending below the cords, and the right cord also showed evidences of a new growth. The condition now was so clearly malignant and the dyspnoea was so great, that I performed tracheotomy, using equal parts of a sterile solution of 1% cocaine and 1-10,000 adrenalin.

This solution I have used in a number of tracheotomies in adults, and it has given uniformly good satisfaction.

I told him that a radical operation still offered him some chance, but it was not until three weeks after the preliminary tracheotomy that he would consent to this. A total laryngectomy was performed in the Samaritan Hospital in Troy, and for a week the patient got on very well.

The method that has been advocated by Gluck, working from above downward, was followed. Because the growth had extended into the upper part of the trachea, the trachea was removed with the larynx for some distance below the site of the preliminary

tracheotomy, the severed trachea being stitched to the skin. Chloroform was administered through the tracheotomy tube during the operation.

The patient was given no nourishment by the mouth for several days after the operation and for a week got along very well. He then developed a pneumonia and died on the thirteenth day after the operation.

The operation was performed in conjunction with Dr. Harvie, of Troy, Attending Surgeon to the hospital, and Dr. Barnes.

The pathological report is as follows:

Samaritan Hospital, Feb. 9, 1907.

Gross description.—The specimen consists of a larynx. On its anterior surface just below the thyroid cartilage, a small portion of skin is attached, in the center of which is a sinus communicating with the trachea below the larynx, the result of a tracheotomy. The walls of the sinus are lined with granulation tissue. The inner opening into the trachea is about 1 cm. in diameter, and much larger than the surface opening. By looking into the larynx from above, a vegetative growth is found on the vocal cords, particularly on the left side and the cords seem partially fixed. After sectioning the larynx posteriorly in the median line, the left side is found to be almost completely covered with a whitish, minutely nodular, fungoid growth, of firm consistency. The growth extends to the right side also, but involves only the anterior third of the right vocal cord. The central portion of the growth is softened, and somewhat degenerated, the advancing edges elevated and hard. No regionary metastases are found.

Anatomical diagnosis.—Epithelioma of the larynx.

Microscopic appearance.—The surface epithelium at the margin of the growth is of normal appearance, its transition into the malignant growth can be definitely demonstrated in the sections. The growth itself is entirely of epithelial origin, and consists of irregular columns or spheres of epithelial cells, growing into the underlying tissue in all directions. The cells are cuboidal or round, of large size with a pale-staining nucleus, and many mitotic figures can be seen. The marginal cells are more closely packed, and resemble in their arrangement the stratum Malpighii in the epidermis. The growth shows a tendency to rapid degeneration in the centres of the columns and spheres, for frequently the cells are replaced by granu-

lar detritus. The interstitial connective tissue is thickly infiltrated with small mononuclear leucocytes and plasma cells, and in some areas there is a proliferation of the small capillaries. The hyperplasia of the connective tissue is definite, and has the appearance in places of granulation tissue. No metastases could be found.

Revised diagnosis.—Epithelioma of the larynx.

H. W. CAREY.

Gluck has had undoubtedly by far the largest experience in total laryngectomy for malignant disease of the larynx, and has had the most successful record, considering the large number of operations he has performed.

Recently Chevalier Jackson (*British Medical Journal*, November 24, 1906,) has reported eight total laryngectomies, with no operative mortality. One of his patients lived seven years after the operation, and one case lived three years without recurrence, dying of cerebral hemorrhage. One patient lived eight months, dying of alcoholism. Of the remaining five, three recurred within a year, one apparent cure was lost sight of, and one was too recent to record.

Preliminary tracheotomy seems to be advisable, although Keen, without preliminary tracheotomy, severs the trachea and stitches it to the skin as the first step, after exposing the larynx and trachea. This method of stitching the trachea to the skin was also successfully employed by Solis-Cohen in his well known case.

In conclusion, the writer would say that in his case the delay occasioned by the favorable report of the pathologist was certainly injurious to the patient. An early thyrotomy might have been performed, with a much better chance for the patient. In such doubtful cases, it would seem best to depend upon the naked eye diagnosis of cancer and go ahead with the operation immediately.

The removal of pieces of the growth for microscopical examination is not always wise, because if only small pieces are removed from the surface of the growth, the examination may not show malignancy.

CASE B. A search of the literature of the past twelve years, revealed the fact that sarcoma of the pharynx in young children is rare, so that the writer considered the following case worth placing on record.

A. S., a girl aged 8 years, was referred to the writer on January 11th of this year, with the history that for several months there had

been an increasing difficulty in breathing. The child's parents are living and well, and there are five other perfectly healthy children in the family. The child's great grandfather is said to have died of cancer of the throat. The child had lost weight rapidly and was in bad general condition.

Examination of the throat showed the presence of a large mass, including the soft palate, and pushing it forward. The growth extended downward almost to the epiglottis, and apparently into the naso-pharynx, although this could not be examined, as the finger could not be carried around and back of the growth. There was a constant discharge of an offensive muco-purulent material from the left nostril.

The mass was firm to the touch, and did not show any evidence of breaking down. There was some involvement of the glands, particularly of the left side of the neck.

Dr. Elting, of Albany, a general surgeon, saw the case with me and agreed that the tumor was inoperable. The child was admitted to the Child's Hospital on January 14th, and it was decided to try mixed toxins (erysipelas and bacillus prodigiosus,—Coley's serum), following the method advised by Coley (*Journ. Amer. Med. Ass.*, March, 1906). A piece of the growth was removed for microscopical examination, and sent to the Bender Laboratory, with negative results. Here again, although a fairly large piece was removed, we probably did not go deeply enough to show the malignant character of the growth. Clinically, however, there was no doubt at all about its malignant nature.

The injections of the serum directly into the mass were started a few days later. We started with m. 1-3, increasing m. 1 or more each time. We got no reaction until January 25th, after the injection of m. III into the mass. Temperature rose to 103.4° F. Pulse, 136. On the following day the temperature was down to 99° F.

There was another reaction (temperature 102° F., pulse 160), after the use of m. IV of the serum. On February 3rd, a hemorrhage from the nose and throat, lasting about an hour, occurred, and was controlled with adrenalin and ice.

The amount of the serum was steadily increased, and another reaction (temperature 102.6° F., pulse 140), obtained, when m. VIII were injected. Reactions were also obtained when m. XIV and XVI were used. The injections were given at first every other day and finally every day, as much as m. XX being used.

The patient breathed with difficulty during the night of March 4th, and died on the morning of March 5th. Adrenalin injections were not used in this case, because the method is slow, and the child's condition was so bad that we thought prompter results would probably be obtained with the mixed toxins. Iodide of potash had been used without any result, and had to be stopped because it greatly increased the difficulty in breathing, by producing an oedema of the mucous membrane.

For a few weeks after the serum injections were started, the child appeared to improve, the breathing being easier, and the growth apparently becoming a little smaller.

On the whole, however, in this case at any rate, the use of Coley's serum did not do any good. It certainly did not produce the slightest softening of the growth. The autopsy findings were as follows:

The Bender Hygienic Laboratory.

Name. Anna S. No. 0-1108. Date. Mch. 6, 1907.

(Dr. Robinson.)

Aged, 8 years. Child's Hospital. Service of Dr. Theisen.

Clinical Diagnosis.—Sarcoma of soft palate.

Body is that of a fairly well-built, poorly nourished female child, measuring 123 cm. in length. Rigor mortis absent. Pupils unequal, the right being dilated and measuring 5 mm. in diameter; the left contracted and measuring 1.5 m. in diameter. A ptosis of the left upper eyelid is present. The cervical lymph nodes on both sides, but especially on the left, are enlarged and readily palpable.

On exposing the abdominal cavity, the intestines are seen to be distended with gas, the appendix is bent on itself and bound to neighboring tissue by firm fibrous tags. The mesenteric lymph nodes are apparently normal; pleural cavities, normal; pericardium, normal; heart, normal; lungs, normal; liver and gall bladder, normal; spleen, normal; stomach and intestines, normal; kidneys, normal; adrenals, normal; pelvic organs, normal; aorta, normal; neck, the left lateral aspect of the neck downward from the left ear is slightly prominent and some enlarged lymph nodes are felt. The mouth is two-thirds filled, principally on the left side, with a firm, globular growth attached more at the left side of the junction of the soft with the hard palate, which extends from there to the side of the cheek down along the side and back of the pharynx on the

left, and is most intimately adherent to the left side of the pharynx, especially to the pterygoid process, and as far down as the gullet. The tongue fills the lower part of the oral cavity and the growth the upper part, both meeting tangentially as two spheroids, make it appear as if the communication with the pharyngeal opening was obliterated, but the obstruction is only apparent, and a finger can be readily introduced between the tongue and tumor into the pharynx.

By incision along the oral attachments of the tumor and by loosening up the pharyngeal attachments, the trachea, larynx, esophagus and tongue can all be removed with the growth.

The tumor consists of a pinkish-white, roughened, irregularly lobulated mass of tissue measuring about 7x4x4.5 cm. It involves the entire soft palate, the pillars of the fauces on both sides, the left side of the pharynx from the pharyngeal vault, downward to a level with the epiglottis, the lower and right-hand portion filling in the space above the epiglottis, but being free and unattached in this part, the attachment on the left side supporting the growth.

On section, the surface is homogeneous in appearance with no coarse connective tissue stroma, but apparently very cellular. The tissue is glistening and semi-translucent, of uniform consistency and of an elastic nature. On a level with the upper margin of the thyroid cartilage and to the front of the lateral border of the mass above described is a smaller, but similar mass measuring 3x2.5x2.2 cm., probably a group of enlarged cervical lymph nodes.

Anatomical Diagnosis.—Sarcoma of pharynx. Enlargement of cervical lymph nodes. Chronic periappendicitis.

Microscopic Description.—Sections through the tumor show tissue which in most parts is densely cellular. The cells have deeply staining somewhat vesicular, oval or spindle shaped nuclei with little or no intracellular substance. In places the cells are arranged in fascicles, which cross and interlace and here the structure is less dense than elsewhere. Connective tissue trabeculae penetrate in various portions, and oedema of some areas is present. Blood vessels are abundant and fairly well formed. The enlarged lymph nodes in connection with the tumor do not show an invasion by the growth. A marked hyperplasia of the lymph follicles and lymphoid elements exists.

Microscopic Diagnosis.—Spindle celled sarcoma with hyperplasia of neighboring lymph nodes.

J. O. ROBINSON.

The following case reported by Halsted (Trans. Amer. Laryngol. Rhinol. and Otol. Soc., 1897), was somewhat similar to the writer's:

Emma R., aged 2 years, was brought to consult him on May 6, 1896. The child's respiration was labored, noisy and rapid, skin of the face of a milky pallor, with marked cyanosis, and the child was only partially conscious of its surroundings.

On examination, the right side of the nose was seen to be occluded by a growth projecting externally. Left nostril was also occluded. The soft palate was pushed forward by a mass presenting itself in the oro-pharynx. There was no ulceration. The child's dyspnoea was so great that Halsted performed tracheotomy almost immediately. Twenty-four hours later there was a hemorrhage through the tube. The child took no nourishment and died two days after the operation. A histological examination of the specimen obtained at autopsy showed it to be a sarcoma.

Melville Black (*Colorado Med. Jour.*, April, 1901), has reported a case of papilloma of the soft palate, turning into sarcoma, in a child 11 years old. Two large tumors of the soft palate were removed, which microscopically were reported to be papillomata. There was a recurrence four weeks after the operation, and an examination then showed the tumor to be a round celled sarcoma. Child died.

Another case of round-celled sarcoma of the pharynx has been reported by Hanszel (Ber. d. Wiener laryngol. Gesellsch., January 9, 1902), in a child 3 years old. The author states it developed as a phlegmonous angina.

Schmidt has reported a case of sarcoma of the soft palate in a boy 12 years old. A radical operation was performed, but the final result is not given. (Adolf Schmidt. Alveolarsarcom des weichen Gaumes. *Münch. Med. Wchnschr.*, No. 10, 1894.)

A case of fibro-sarcoma of the naso-pharynx has been reported by Mermet (Soc. Anat., Paris, July 14, 1894.) A tumor as large as an egg, probably originating in the inferior turbinate, posteriorly, hung down into the pharynx. It occurred in a girl 16 years old.

Another case in a girl of the same age, was observed by Simpson. (Trans. Amer. Laryngol. Ass., 1893). This was a sarcoma of the soft palate, and another example of the degeneration of a benign into a malignant growth. The soft palate was removed. Death resulted eight months after the operation, and over two years after the development of an apparently benign growth.

To consider briefly now the result of the treatment of sarcoma of the pharynx in children, the outlook, judging by the reported cases, is not very promising.

W. B. Johnson, however (*N. Y. Med. Record*, 1894), has reported a case of sarcoma of the palate successfully treated with the toxine of erysipelas. The patient, a girl 16 years of age, had a sarcoma involving the soft palate, posterior wall of the pharynx and epiglottis. The mixed toxins were used and after nine months treatment, great improvement resulted. The growth "nearly" disappeared.

Hanszel (*Monatscher, f. Ohrenh.*, No. 19, 1902), also reports a case of improvement in a sarcoma of the pharynx as the result of a streptococcus and staphylococcus infection.

Sarcoma of the pharynx in adults will not be considered in the writer's paper.

Emerson has recently reported a case in an adult, in which the use of Coley's toxines resulted in the practical disappearance of the growth. There was a recurrence and death after seventeen months. (*THE LARYNGOSCOPE*, March, 1907).

There are also several cases on record in which the arsenic treatment resulted in some improvement. I could not find any record of its having been used in sarcoma of the pharynx in children.

CASE OF OTOSCLEROSIS.*

BY GEO. E. SHAMBAUGH, M.D., CHICAGO.

The case I have to present is one suffering from an ear lesion, which today occupies the central point of interest in clinical otology.

He presents, in a large measure, many of the characteristic clinical symptoms of this condition. The young man is 15 years of age, and has had no previous ear trouble. There is, however, distinct history of hereditary ear trouble. His father, who is also quite hard of hearing, tells me that in past generations there were a number of instances of intermarriages of first and second cousins. He has a brother who has for many years been quite deaf. The father dates his own ear trouble from the time when he was ten years old, when he had an attack of scarlet fever. There has been a gradual loss of hearing from that date until the present. On examining his ears I find the drum membranes show no scarring or any evidence of a past suppurative process, and aside from a considerable degree of thickening, appear quite normal.

In making the functional examination it was necessary to shout in order that he might hear at all in either ear. He was unable to hear any of the tuning forks by air conduction. Even the piercing tones of the c^4 fork were entirely lost. No hearing for any part of the range of the Edelmänn Galton Whistle was present. On the other hand, the bone conduction was still moderately prolonged. There was no distinct lateralization in the Weber test, and the Rinne was, of course, absolutely negative.

The patient I present began to lose his hearing only about three or four years ago. He dates the onset of the trouble from a severe cold in the head, when he suffered for a short time from pain in both ears. The onset of the deafness, however, was very gradual and there is a question whether his present ear trouble bears any relation of cause and effect to the severe cold in the head. The patient's hearing has grown slowly but steadily worse since it began. At no time has there been any distinct tinnitus aurium. The only clearly defined sensation referable to the ears has been a subjective sensation of fulness, which is much more marked during unsettled weather.

On examining the patient, the tubes are found to be normally open, both ears are readily inflated even by the Valsalva method. The drum membranes are normal in all respects, except for a decided reddish glow which is transmitted through the drum membrane, especially on the right side, from a congestion of the mucous mem-

* Read before the Chicago Laryngological and Otological Society, February 19, 1907.

brane over the promontory. The same condition has been noted on the left side, but is not so marked at present.

The functional tests give the characteristic reactions for a profound obstruction in the sound conducting mechanism, an obstruction which can only be accounted for by a more or less fixation of the key to the sound conducting apparatus, namely, the foot plate of the stapes. There is complete loss for all tones at the lower end of the scale; even c fork 64 d. v. is not heard in either ear. On the other hand, the c' tuning fork is heard quite normally in both ears. The lateralization in the Weber test is toward the more affected ear of the two. The Rinné is decidedly negative. The Schwabach test shows a pronounced prolongation of the bone conduction.

The negative Rinné, the lateralization to the more affected ear, and the prolongation of the bone conduction, together with a loss of the lower part of the scale, are, of course, characteristic of all obstructions in the conducting mechanism. In this case, however, the Rinné is so markedly negative, the loss of the lower part of the scale is so extensive, and the prolongation of bone conduction is so pronounced, that these symptoms could arise only from a decided fixation of the foot plate of the stapes.

A localized catarrhal process in the middle ear about the fenestra vestibuli, would hardly account for symptoms as marked as they appear in this case.

There is, in addition to these reactions, a loss of the highest tones of the Galton Whistle. He does not hear in either ear anything of the Edelmann Galton Whistle above the mark 7.

The diagnosis is clearly one of otosclerosis. The loss of the highest tones is, of course, a secondary symptom due to the involvement of that part of the organ of Corti just internal to the promontory.

In his father's case, the diagnosis of an otosclerotic process in an advanced stage is equally clear. The points of special interest here are: In the first place, the hereditary causative factor with the history of the intermarriages, which is often recognized in otosclerosis; in the second place, the characteristic reddish glow of the membrane tympani transmitted from the promontory; in the third place, the loss of the upper end of the scale which is a strong confirmatory evidence that the perception of the highest tones takes place in the lower end of the cochlea, that is the part which forms the promontory.

FORMIDINE IN AFFECTIONS OF THE EAR, NOSE AND THROAT.

BY OTTO J. STEIN, M. D., CHICAGO.

Quite a long time ago, I was asked to subject a new synthetic preparation called methylen disalicylic acid iodide or Formidine to clinical tests, in order to determine its value in ear, nose and throat cases. For this purpose I utilized the abundant material at my service at the Post-Graduate Hospital, and later, on account of the good results obtained, I was led to employ it in my private work. I have subjected the preparation to various severe tests in many cases, and the good results following its use incline me to the opinion that in methylen disalicylic acid iodide, we have a much better preparation than iodoform, for which it acts as an admirable substitute. The following cases have been taken at random out of several hundred, just to show the broad range of its application.

The powder is very finely divided, and on account of its adhesive qualities very little is required to coat the diseased mucous membrane. It is also admirable for impregnating gauze, and is not unpleasant to handle, as it is practically devoid of odor. It does not cause dermatitis, and does not stain the tissues as iodoform does. At my clinic at the Post-Graduate, it has been used in the treatment of a great number of cases in the following forms, powdered formidine, 25% mixture in glycerine, formidine gauze, 2% formidine ointment and a 20% formidine ointment.

The powdered form was used on operated surfaces, as after sub-muco-perichondrial resections of the nasal septum; turbinotomies and turbinectomies; cauterization of the turbinals; removal of septal ridges; mastoid operations and radical frontal sinus operations, and also in suppurating conditions of the nose and ear, like tubercular and syphilitic ulcerations; simple traumatic ulcerations, and chronic suppurative otitis media. Aside from these conditions, the powder has been used in a series of hypertrophic rhinitis cases, with the result of seemingly having reduced the amount of hypertrophy. The powder, when dusted on an inflamed or highly congested membrane in the nose or ear at times produces a smarting sensation, which is of very short duration, although in one or two cases it lasted longer.

It is remarkable that such an amount of formic aldehyde as 5 per cent. liberated in this preparation should not provoke greater discomfort, especially in the nose, which is very susceptible to this drug, but I interpret this as due to its very gradual liberation. The preparation is represented as a true chemical compound with the formula, $C^{15} H^{10} O^6 I^2$, dissolving slowly in the alkaline organic secretions and developing the characteristics of its constituents, iodine 47%, salicylic acid 51% and formic aldehyde 5%.

The formidine gauze was prepared by dusting plain sterile gauze with the powder, and has been used in a large series of chronic otitis media suppurative cases, as well as in the latter stage of the acute otitis media suppurative cases. The ointments and the glycerine mixture have been applied to the various ulcerative conditions within and around the nose, like syphilis and tuberculosis, excoriated alæ, perforated septum, etc. In the treatment of atrophic rhinitis with incrustation of fetid discharges the nostrils were packed with a wool tampon covered with the ointment or glycerine mixture, the wool being preferable to cotton on account of its elasticity and wiry character. It thus holds the medicament in constant and immediate contact with the tissues, allowing prolonged effect of the drug.

CASE 1. H. B., female, aged 21 years, had suffered since childhood with chronic suppurative otitis media. The condition was bilateral. The prominent symptoms were continuous purulent discharge and deafness. The radical mastoid operation was performed, using formidine gauze and formidine powder in the after-treatment. Healing took place rapidly, with no evidence of infection of the incisions.

CASE 2. J. B., female, aged 49 years. Had a bilateral chronic suppurative otitis media for many years. The entire drum membrane and the ossicles on one side had been destroyed by the suppurative process, exposing an enormous carious cavity including antrum and cells. The ear was cleansed thoroughly at each treatment, and the eroded surface touched with trichloroacetic acid, and then dusted with formidine powder and packed with gauze. Later the gauze was omitted. The entire cavity healed promptly under this treatment. I saw this patient the other day, two years after, and the ear had remained absolutely dry and healed.

CASE 3. M. J. B., female, aged 30 years; syphilitic. She was suffering from catarrhal symptoms and had a large perforation of the nasal septum and ulceration of the anterior ends of both lower turbinates. Received internally anti-syphilitic treatment, and the nose was treated by cleansing the ulcerated surfaces, followed by an oily spray, and then insufflations of formidine powder. The disagreeable nasal symptoms promptly subsided.

CASE 4. W. P., male, aged 35 years; postal clerk; has had a purulent discharge from both ears for twenty-five years. Two years ago the discharge from the right ear ceased. There was a low perforation of the left drum membrane, and a sinus in the roof of the canal discharging watery pus. A probe passed through this sinus into the attic led in the direction of the antrum, and exposed bone was easily felt. A radical mastoid operation was performed, and formidine powder was used in the after treatment, but the patient was worried because it discolored the discharges, so its use was discontinued.

CASE 5. L. R., male, aged 13 years; has had a chronic discharge from the right ear for three years; the drum membrane was entirely destroyed, and the middle ear full of granulations and pus. The radical mastoid operation was done, and in the after-treatment no gauze packing was used at all. The cavity was mopped dry and dusted with formidine powder. Three weeks after the operation the wound was dry and the patient was discharged.

CASE 6. L. T., female, aged 8 years. Complained of a discharge from the right ear for two years, accompanied with deafness. The ear was dusted with formidine powder, and after four months' treatment it was absolutely healed, and remained so until the present time, one year.

CASE 7. W. P. S., male, aged 33 years. Had a perforation of the right drum membrane and a profuse sero-mucous discharge from the middle ear of several weeks' standing. The discharge was checked within ten days, and the edges of the perforation stimulated so that it closed, after another week's treatment with formidine powder.

CASE 8. J. E. S., female, teacher, complained of severe pain in ear and deafness. The entire ear and the face about the ear was swollen, and the meatus closed by a crop of furuncles, causing intense pain. In this case I deviated from my usual custom of incising the boils, and instead introduced a firmly-fitting tampon of cotton covered with formidine powder. The improvement was rapid, immediate and lasting.

CASE 9. M. Z., male, aged 60 years, acute tubercular otitis media. The dry treatment with the powder dusted on the gauze was used for a period of twenty-one days, after which the ear remained dry.

CASE 10. A. W., aged 7 years, ulcer of the anterior septum, and

CASE 11. H. W., aged 14 years, ulcer of anterior septum, are brothers. The ointment was used at first, but on account of the difficulty of keeping any ointment in contact long enough in the nose unless applied on a tampon, the oil spray followed by the powder was used, but it took six weeks before they entirely healed.

CASE 12. M. B., female, aged 30 years, chronic suppurative otitis media.

CASE 13. A. J., male, aged 10 years, chronic suppurative otitis media.

CASE 14. M. L., female, aged 36 years, chronic suppurative otitis media.

CASE 15. G. L., male, aged 11 years, chronic suppurative otitis media. These four cases were treated with the powder and gauze and the discharge ceased entirely after three to six weeks, and have remained so from six months to a year later.

CASE 16. N. F., female, aged 35 years, ulcer of septum.

CASE 17. H. P., male, aged 21 years, ulcer of septum.

CASE 18. H. G., male, aged 9 years, ulcer of septum. In these three cases the oil spray and powder was used three times a week for three or four weeks, at which time they were healed.

CASE 19 and CASE 20 were cases of acute otitis media, in which the gauze and the powder were used six to eight days after the spontaneous appearance of the discharge. In both cases the ears were dry within ten days.

CASE 21 and CASE 22. Miss G. and R. T., atrophic rhinitis with ozena. The ointment on large wool tampons is used; one nostril is tamponed at a time, which is allowed to remain twelve to twenty-four hours. These cases are still under treatment, but show considerable improvement.

100 State street.

Esophagoscopy for Foreign Body. HERMANN VON SCHROETTER.
Monatschr. f. Ohrenh., Berlin, Nov. 1904.

The author reports a case of a boy 16 years old, who had been suffering from a traumatic stricture of the oesophagus since infancy. He had been taught to pass a bougie himself, and was able to keep himself comfortable until two weeks before consulting the author. At that time he had swallowed a bone, which lodged in the oesophagus at the site of the stricture. The foreign body was distinctly and easily seen in the esophagoscope, but it had become impacted in the stricture. After some difficulty in prying it loose, he was successful in removing it.

YANKAUER.

CLINICAL NOTES ON THE ACTION OF A NEW IODINE PREPARATION IN NOSE AND THROAT WORK.

BY FREDERICK MENGE, M.D., CHICAGO, ILL.

In operations upon the accessory sinuses, iodoform has served a most useful purpose as a dressing, but the disadvantage of its odor and staining property are so marked that any really efficient substitute which does the same work, and at the same time does not possess these extremely disagreeable features, would be very acceptable to all surgeons who do nose and throat work.

An article by Ford*, in which he related his experience with methylene disalicylic acid iodine (formidine) used as a glycerin emulsion in large abscesses, first attracted my attention to this substitute, and he also stated that his use of the preparation as a dusting powder had been very satisfactory; that there was no odor from it; that it did not stain the tissues and dressings and that it caused no irritation. Such a dressing I had long been looking for, so I determined to try formidine. The results are set forth in the following case histories.

CASE 1. Mrs. R., aged 35 years, married, housewife, had been suffering for twelve years with an infection of the antrum of Highmore, which had finally caused considerable necrosis. The radical operation was performed, and the wound packed with gauze prepared with formidine instead of iodoform. The result was an absolute cure. There has been no indication of a recurrence in one year.

CASE 2. Mr. F. S., aged 40 years, married, farmer, had an antrum infection. There was pus discharged through the nose and marked ozena. The antrum was opened, curetted and packed with formidine gauze. The ozena had disappeared on the third day. The opening in the alveolar process was allowed to close in three months. There has been no return after a period of ten months.

CASE 3. Mr. P., aged 50 years, married, farmer, had an infection involving the anterior ethmoidal cells, the frontal sinuses and antrum. The frontal sinus, antrum and ethmoidal cells were all opened and packed with formidine gauze. The patient reports a good recovery and there was no irritation set up by all these packings.

The antrum in each of these cases was redressed daily, a new gauze packing being put in, covering a period of three months. No irrigation of any kind was used. Bacteriologically the infection in each of these cases showed staphylococci.

34 Washington street.

* FORD: "A New Substitute for Iodoform," *Therapeutic Gazette*, March, 1907.

INSTRUMENTAL AIDS TO BRONCHOSCOPY AND ESOPHAGOSCOPY.

BY CHEVALIER JACKSON, M. D., PITTSBURGH, PA.

The ingenious safety pin closer of Dr. Harris P. Mosher is such a successful instrument that I have taken the liberty of modifying it to increase the facility of its use. I have had the ring hinged so that it lies in the same plane as the stem during introduction, until it passes the pin, when by means of the handle it is turned to a

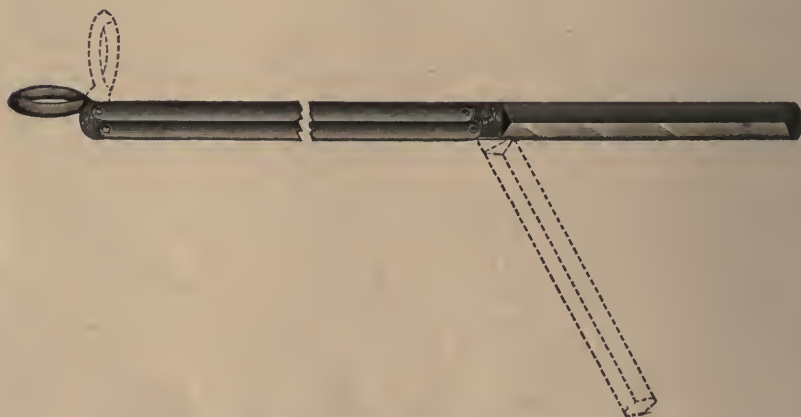


Fig. 1. Author's Modification of Mosher's Safety-Pin Closer.

right angle with the stem below the pin. Then the forked instrument of Mosher is used to push the pin down into the ring. In case of a small pin, the ring is sufficiently small to go through the esophagoscope. If a very large ring is needed, the closer can be first introduced past the introitus, then the esophagoscope is threaded over the handle and stem of the closer or better still, alongside the closer. In the latter method, when on inspection through the esophagoscope the tube mouth arrives at the ring of the closer, both may be pushed down together until the pin is reached, when the tube is stopped and the closer pushed down until the ring is below the pin. Of course a closer is only needed in case of a pin whose uncovered point sticks upward. In some instances it is easy with forceps and hook to get the point into the mouth of the

esophagoscope. Care must be taken that the instruments do not wound the esophagus. It is one of the most sensitive organs in the



Fig. 2. Author's Separable Spatula for Tracheo-Bronchoscopy.

body. Its intolerance of injury is the chief reason why we need a safety pin closer.



Fig. 3. Author's Endoscopic Tube Forceps.

The split tube spatula of Dr. Gustav Killian has so greatly facilitated the introduction of tracheo-bronchoscopic tubes, that a modi-

fication in use by the writer seems worthy of mention. Being separable horizontally there is no danger of wounding the mucosa when the instrument is used by the less skilful.

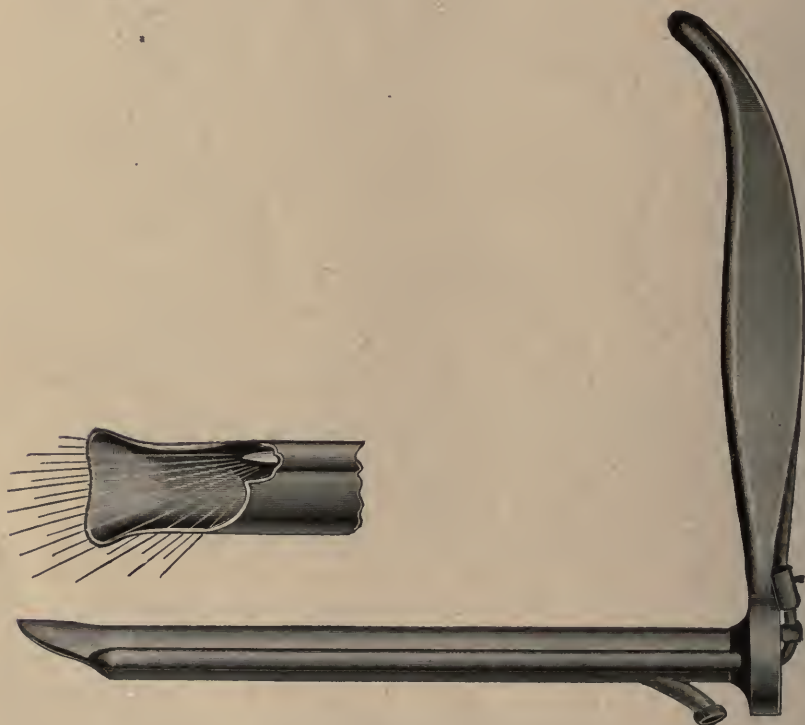


Fig. 4. Author's Tubular Speculum.

The tube forceps shown in Fig. 3 are so designed that the tube is pushed over the jaws and the jaws are not pulled into the tube, so that they do not retreat from their bite. Various patterns of jaws and varying lengths of canulae may be used interchangeably.



Fig. 5. Endolaryngeal Knife for Use through the Tubular Speculum.

The tubular speculum (Fig. 4) is of value for all kinds of endolaryngeal work. Specimens may be taken, benign growths may be removed, galvanic, faradic and galvano-caustic applications may be made, edematous masses punctured and all endo-laryngeal surgery done with an accuracy otherwise impossible.

430 Park Building.

EDITORIAL.

MISTAKES OF PHYSICIANS.

It may be deemed ungracious to write of the mistakes of other physicians, and more particularly when errors of judgment entail fatal consequences, and it may seem suicidal to confess one's own blunders, but the welfare of the race is paramount to the interests of individuals.

There are fundamental principles which should underlie the conduct of physicians and govern their actions and their relations, both with each other and with their patrons. Referring first to some faults of the specialists, and second to those of the general practitioners, we are driven to the conclusion, with regard to the former, that many of them are guilty of committing a serious mistake when they undertake to confine themselves exclusively to a special branch of practice from the time when they obtain their medical degree. The inevitable tendency of such a course is a regrettable narrowness, which a few years of general practice would forestall. Five years of such an experience (the writer had fifteen) would lay a foundation, upon which one could establish a more masterful grasp of the subjects of the specialties and render his services generally more to his own satisfaction and of greater value to his patients. It broadens the horizon and enables a man to measure up to the liberal standard of a well-equipped, all-around physician, and to recognize the various diseased conditions which may require the attendance of specialists in other lines, or of general practitioners.

The following cases will serve to illustrate this contention: An eye specialist was called in consultation by a general physician in a case of suppurative of the middle ear with mastoiditis. The nature of the disease was not recognized in time to avert an intracranial involvement and death, although an ear surgeon would have detected the conditions readily. Had it been an eye disease, a better consultant could not have been called.

A physician from a distant city referred a patient to me for a mastoid operation, but, before seeing me, the young lady was piloted (I do not say pirated) to a specialist in operative surgery, who operated upon her, with the result of producing a facial paralysis. The distortion of her features so shocked the fine sensibilities of the pa-

tient that she declared she had rather be dead than so hideously deformed." The operating surgeon, who has long since gone to his reward, was highly accomplished in the field of general surgery, but made the mistake of invading the domain of the specialist in aural surgery.

Here is another illustration of the same deplorable usurpation of an unfamiliar department of surgery: A general surgeon, with an enviable reputation as such, performed a mastoid operation on a patient for suppuration of the middle ear and mastoid process. Seven months after the operation the suppuration of the ear continued, a keloid growth occupied the site of the mastoid scar, and a polypoid mass filled the space which was originally the external auditory canal. There was no hearing in the affected ear except by bone conduction, and facial paralysis was added to the pitiable results. The new growth was removed from the canal, following which the hearing was good for ordinary conversation at a distance of more than 30 feet, but it required nine months of treatment to overcome the facial paralysis sufficiently to make firm closure of the eye and angle of the mouth possible. The fibres of the occipito-frontalis muscle remained parietic. The duplicate of these results has never occurred in the writer's practice, nor, indeed, a single example of complete, permanent facial paralysis from an operation. Such unhappy illustrations could be multiplied where it desirable to emphasize this phase of the subject.

The duties of the specialist and of the general practitioner often approach and overlap each other, dovetailing as it were, necessitating a comprehensive knowledge of the principles involved in the coördinate branches of medical practice, so as to conserve, first, one's own success and the patients' interests without duplicating the cost to them; and, second, to serve the patients intelligently and in good faith by intrusting their care to another, when necessary, in a line of practice in which the other is more skilled. One should not attempt to do what another can do better, speaking in a general way. Each man should confine himself to that which he can do best. This combination of specialized skill and conscientious coöperation among medical workers constitutes the ideal of modern medical practice.

The young physician may be depressed, at first, by the fear that he will not retain the patronage of all patients who consult him, but he should reflect that, if all physicians will adhere to the same high principles, he will be compensated by the mutual benefits resulting

from this reciprocity. And even if all his confreres do not evince this spirit of fraternal courtesy, he will eventually earn a reputation for efficient and fair treatment, which will bring its returns. But, if one is inclined to question this proposition, he should regard the feeling of having fulfilled the Hippocratic conception of the ideal physician as worth possessing. A consciousness of true worth and self-approval should be highly prized assets in one's stock of manliness. No doubt such old-fashioned ideas will provoke a wink and a smile from the rare medical grafter, but life is too short and eternity too long to be disturbed by them. The rank and file of the medical profession are sincere, and worthy of the confidence reposed in them.

In order to elucidate the argument I will resurrect some illustrations that have come within my own knowledge, but they are so ancient as to work no injury to those who were involved:

A boy, 14 years old, was brought to the writer's clinic, suffering with pain in the ear. There were, also, pain, redness, swelling and tenderness in the region of the corresponding mastoid process. His mother was informed regarding the nature and danger of the disease, and it was endeavored to impress upon her mind the imperative necessity of daily treatment and constant attention to the case. This advice was totally ignored for several days, when the writer was sent for in urgent haste and found the boy unconscious, delirious, with inequality of the pupils and convulsive facial movements. A suppurative inflammation of the middle ear and mastoid process was plainly responsible for the symptoms. An incision disclosed a mastoid fistula; pus was liberated, the cavities were irrigated, the pressure relieved and the danger appeared to be over. The parents were informed that, notwithstanding the improved condition, it would be necessary to operate upon the bone in order to insure ultimate recovery; but they demurred. A few days passed, in which the boy seemed to be getting well. He was a bright little fellow and amused himself by beating a drum for the edification of the neighbors. Suddenly a relapse occurred; the parents were advised that further temporizing would be futile, and that, unless I were permitted to follow the dictates of my judgment, and to operate, I would not be responsible for the consequences. They decided to act upon the advice of their neighbors instead, who said: "Don't let Dr. Bishop butcher your boy," and I withdrew from the case.

Several days later I received a telephone message from Mercy Hospital stating that a boy whom I had previously attended had been brought to them in an unconscious condition, and that the physicians on duty were unable to make a diagnosis. It soon became evident that this was the patient just described, and I urged an immediate operation as the only means of saving him. However, as it was not convenient for them to operate at once, they preferred to wait until the following day, and asked if I would come at 9 o'clock in the morning. Before that hour arrived I was notified that the child had died during the night—a promising life sacrificed on the altar of prejudice and ignorance. Had I insisted at first upon operating, and had the parents permitted it when it was first advised, there is absolutely no doubt that the boy would have recovered.

Another lesson is that, with the symptoms of brain complications, a discharging ear and the evidence of the opening which I had made into a mastoid fistula, the nature of the malady was not recognized at the hospital and an operation, the only possible avenue of escape from a fatal issue, was not performed, although it may have been too late then to avail anything. In this connection one cannot lose sight of the fact that, had an operation been performed at the last moment and had it failed to prevent death, the parents and neighbors, wise and otherwise, would have attributed the death to the operation and not to the disease which killed, thereby justifying their ignorant warnings, and discounting the brilliant achievements of unhampered surgery. I have always blamed myself for not making the attendance upon this case conditional upon my right to exercise my own judgment from the first, or withdrawing from it as soon as my hands were tied, but, in extenuation, I may plead that this was my first sad experience of this kind.

Another occurrence which I have always regretted was the following: A young man, who was referred to me by a prominent eye specialist of Denver, was suffering from a chronic suppuration of both middle ears and bilateral mastoiditis. He was told at once that surgical interference would be necessary, but, as the symptoms were not then urgent, I did not insist upon an immediate operation. Before submitting to it, he fell into the hands of strangers, as I learned a year subsequently, became delirious, and was taken to the Cook County Hospital, where, it was said that he died of typhoid fever. All the evidence pointed toward an intracranial complication of the ear disease as the cause of death, but it was not recognized,

although the cardinal signs were conspicuously prominent—another valuable life consigned, metaphorically, to the human junk heap. I reproached myself afterward for not having demurred more strenuously to the delay, but one is sometimes at a loss to know how to address himself to such patients in order to protect their interests and yet not to appear brutally blunt and heartless.

A physician came from a distant State and requested me to permit him to witness a number of mastoid operations. He remarked casually (which suggests the word casualty) that he "supposed one had to kill four or five patients before he learned how to operate successfully!" He had operated upon four patients and they all had died! I expressed my astonishment at such a proposition, since I had been performing these operations for many years without having had a death as the result of an operation. I do not say this boastfully. It is a matter of clinical history, and no doubt other operators who have observed the same precautions and methods can cite like results.

Another anomaly is worthy of our serious consideration: It is to be deplored that American physicians do not more generally separate the specialty of eye diseases from that of disease of the nose, throat and ear as is done by the leading European practitioners. Either specialty is large enough to tempt any ambitious man to master. It is argued that there is not enough work in one of them alone to afford a lucrative income, and that Americans have been educated, from an early day, to the idea of resorting to eye surgeons for ear treatment; but if the profession generally would segregate these branches of practice in conformity to their natural remoteness of relationship, it would eventuate in an equitable distribution of work, and the results would be more creditable and satisfactory, both scientifically and economically. The present unnatural association of the two specialties is productive of a vast amount of service which is indifferent—or worse. Men who are enthusiastic and skilled eye surgeons drift along on the borderland of ear, nose and throat diseases, with which they dally as a mere side-show to their favorite eye practice. Their heart is in the one, but the financial returns from the other specialty are too great a temptation to resist.

Only one illustration needs to be cited to show how Americans are wedded to this artificial union of two specialties: It was desired by some Chicago ear, nose and throat surgeons to refer eye cases to an eye specialist who would limit his practice to eye work, and

reciprocate their courtesy. A proposition was made to one of our most prominent ophthalmologists that, if he would practice ophthalmology alone, the coterie of specialists would refer all eye cases coming under their sphere of influence to him, and he, in turn, should refer patients falling within the lines of their specialty to them. The offer was rejected. So, this anomalous and inequitable situation still exists: The ear, nose and throat surgeon refers his eye patients to an eye surgeon, who, the patients observe, treats all diseases of both specialists, keeps all the cases referred to him and does not reciprocate by conferring a like favor. This peculiar practice is so well known that young men who are preparing to practice as ear, nose and throat specialties equip themselves to treat eye diseases also, as a matter of self-preservation. The natural segregation of these two specialties, as we find them in Europe with the resulting highest attainment of perfection, scientifically and practically, seems to be a very remote possibility in this new world.

Let us make a passing note of another mistake, which is made by the occasional type of physician who pretends to be a "specialist" in the line of any disease which he happens to have a chance to treat; but this mongrel exception only serves to prove the rule that the average physician is a foe to fakes. With all its imperfections, I have unbounded faith in the simple honesty of the great mass of the medical profession. In pure and unaffected charity, disinterested faithfulness to its trust, self-sacrificing devotion to duty and immolation for the promotion of humane activities, in heroism unheralded and unpublished, but none the less worthy to be recorded on the pages of enduring history, the medical profession stands without a peer.

BISHOP.

ERRATA.

Prof. Gustav Killian's article entitled "Cauterization of the Four Susceptible Areas of the Nasal Mucosa" was not presented before the American Laryngological Association as stated in footnote on page 341, May issue.

Read "a small neck" for a "small needle" in 7th line from bottom of page 380, May issue.

THE LARYNGOSCOPE.

VOL. XVII.

ST. LOUIS, MO., JULY, 1907.

No. 7.

ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding
that they are contributed exclusively to THE LARYNGOSCOPE.)

MODERN METHODS IN THE REPAIR OF CLEFT PALATE.*

BY JOHN B. ROBERTS, A. M., M. D., PHILADELPHIA.

Much improvement has been made in recent years in the management of congenital clefts of the palate. Fissure of the soft palate is not a very serious deformity, and may usually be repaired by a plastic operation without special difficulty. Freshening the edges of the cleft by paring or by splitting the tissues and applying sutures tied not too tightly may be sufficient. If such operative measures are unlikely to be followed by union, because of tension of the stitches, the surgeon may make flaps of half the thickness of the soft palate and thus bridge the gap.

On this occasion, I am considering especially the treatment of clefts of the hard palate. This condition is usually accompanied by cleft of the soft palate and often by cleft of the alveolar process of the jaw as well. Single or double fissure of the upper lip, the so-called harelip, is very frequently associated with the imperfect palate.

These congenital anomalies of development have been the subject of most surgical discussion, and to a certain extent have heretofore been the despair of operators. Operative treatment has often been unsatisfactory, because of the impossibility of obtaining and maintaining an aseptic wound in the mouth and nose, and because the tissues at hand for closing the gap have been insufficient to permit osteoplastic reconstruction without tension on the sutures. Efforts to complete the partition between mouth and nose by means of obturators with an attached movable velum have not been altogether successful. Such appliances cannot be adjusted in infancy,

* Read before the Thirteenth Annual Meeting of the American Laryngological, Rhinological and Otological Society, New York City, May 30, 31, and June 1, 1907.

must be increased in size as the child grows in stature, and would probably be difficult of adjustment in the adentulous mouth of the aged.

The problem before the surgeon is to close the abnormal communication between mouth and nose so effectually as to obviate the passage of food and air through it. Unless this is done, the infant is nourished with difficulty, and its upper respiratory tract becomes affected with chronic cartarrhal inflammation. Later its nasal chambers and its naso-pharynx fail to obtain normal development, its speech is exceedingly defective, and its facial outlines lack normal contour. As a secondary result of the palatal deformity, the cleft upper lip, when closed by operation, becomes an expressionless band stretched across the teeth. The lower lip is so prominent in contrast to this reconstructed upper lip that the mouth is ludicrously deformed, unless a large V-shaped section is removed from the bulky lower lip. In some cases it may be wise to increase the size and projection of the upper lip by inserting into it a portion or portions of the lower lip or cheek.

I shall now state my views as to the most satisfactory way of solving the operative problem presented by clefts of the bony palate. I use the term operative problem, because I believe that obturators and artificial substitutes for the hard and soft palate should be rejected as inferior to plastic reconstruction.

A. Brophy is correct in his assertion that in most, if not all, cases the cleft is due to a separation of the two halves of the roof of the mouth and not to an actual absence of the bony tissue. The congenital fissure is a want of union of the palate processes of the two upper maxillary and the two palate bones and the inter-maxillary bones. The partition wall between nose and mouth will usually be re-established, if the separated halves are forced into apposition. If the infant's mouth is closed so that the relation of the alveolar arch of the mandible to that of the upper jaw may be seen, the abnormal spreading of the upper alveolar halves will be quickly appreciated. It is not improbable that the "bite" of the mandibular alveolus inside of the upper alveolar arch may tend in the earliest months of infancy to force the lateral halves of the upper jaw still further apart and thus increase the cleft in the palate.

B. Acceptance of the propositions just stated compels the operator to grant that the bony roof of the mouth should be re-created as soon as possible after birth, provided this is possible without

grave risk to life. A simple and most efficient method of doing this is to carry wires through the two segments of the upper jaw, force them together while they are semi-cartilaginous in structure and hold them in contact by twisting the ends of the wires over lead palates.

This operation devised by Brophy is philosophically and mechanically correct. It is surgically wise, because it is quickly performed, causes little hemorrhage, and gives rise to no shock of importance. It should be performed within a few days or weeks after birth, although in neglected cases its performance is possible, perhaps, up to six months. At that time the cartilaginous jaw usually becomes too rigid from ossific deposits to be thus drawn into proper shape. Sometimes the coaptation in these late cases may be obtained, but only after dividing the jaw above the alveolus with a chisel or saw. This increases the gravity of an otherwise safe operation, because bleeding and shock are augmented. It is not improbable that children of six or more months are more shocked by simple operative procedures than newly-born infants.

After the wire "tie-beams," as they may be called, have been left in position for a couple of months, the bony roof of the mouth will be firmly reconstructed. The wires may then be removed, and the fissure in the soft palate closed with sutures. The edges of the bony cleft may be freshened when the wires are inserted; but this step is not essential. If the margins touch, the pressure will soon cause erosion and adhesion. The soft palate may be repaired at the time the hard palate is operated upon, if the operator thinks it judicious to prolong the operation at that time. It will readily be understood that the probability of success after suturing the soft curtain of the palate will be greatly increased by reason of the previous approximation and closure of the cleft in the bony palate. The upper jaw has been made much narrower and the soft parts have been carried towards the middle line at the same time. Therefore there will be comparatively little strain on the sutures which draw the soft tissues together. The margins of the cleft may even be in contact before the edges are freshened and the stitches inserted.

C. The error of leaving cleft plates untreated by operation until the patient is two, three, or more years old should not be committed. It is important to remedy the abnormal width of the roof of the mouth while the bones are sufficiently soft and pliable to be bent into place by the surgeon. This abnormality in the relative

width of the upper and lower jaws should be corrected therefore in earliest infancy. The partition between nose and mouth must be complete in early life, so that the nasal chambers, their accessory sinuses, and the naso-pharynx may be developed—that is expanded—by giving to respired air the normal, or physiological, direction of its current. The cavities of the face connected with the function of respiration cannot be properly enlarged during the growth of the infant so long as mouth and nose admit air in breathing as one merged opening.

The existence of cleft of the hard and soft palate, not only contributes to nasal, aural and pharyngeal catarrh, but may, perhaps, increase the liability to pulmonary infections. Its grave, and almost insurmountable, danger to proper speech has always been recognized; but the interference with the facial contour and the physiological needs of the voice, respiration, and dental occlusion have been appreciated only recently.

D. When early operation has been admitted and the delay has therefore allowed the displaced upper jaw bones to become ossified in their unnatural position, the wire-tie-beam method cannot be used. It then becomes necessary to cover the gap between the bones by muco-periosteal flaps obtained from the oral or inferior surface of the palate processes of the upper maxillary and palate bones.

This operative step should be done in early infantile life. It is desirable to undertake it before the molar teeth are erupted. It should be done early because the opening between mouth and nose should be closed as soon as possible in the child's life for the physiological reasons already mentioned. It is often best accomplished before the molar teeth have appeared, because one of the flaps may then be cut so large as to include the mucous membrane overlying the adentulous alveolus.

E. In this stage of the treatment I prefer to use the form of flaps suggested by Lane. He makes a crescentic antero-posterior incision on the roof of the mouth close to the alveolus. This is carried through the mucous membrane and periosteum. A muco-periosteal flap is then raised by blunt dissection from the bone, to be subsequently laid over the cleft in the palate with its raw surface towards the mouth. No incision is made along the margin of the cleft, because the flap obtains its blood supply from this region. On the other side of the cleft a linear antero-posterior cut is made, through the mucous membrane and periosteum, along the *edge* of the

fissure, and a flap is raised from the bone by undermining. The edge of the everted flap from the opposite half of the palate is tucked under this undermined flap and secured by two rows of fine sutures introduced by means of very small sickle-shaped needles.

The flap, which is to cover the fissure of the palate, and which is everted, is cut from the wider portion of the bony palate. If there be no molar teeth present, it may be made very large, when necessary, by including in its area the fibro-mucous membrane covering the alveolus and even some of the mucous membrane lining the cheek beyond the alveolus. The soft palate tissues are treated in a similar though not identical manner.

It is possible that Brophy's method of performing this stage of the treatment is as satisfactory as Lane's. I have had no experience with it. He raises two muco-periosteal flaps by undermining the tissues on the inferior surface of the fissured bony palate. Each flap is raised by an incision made at the side of the cleft. There is no cut made near the alveolus as in the Langenbeck and the Fergusson operations. The undermined flaps are brought together edge to edge in the middle line. Wire sutures carried through the flaps near their attachment to the bone are passed through leaden plates, or splints, and twisted. These tension sutures and splints steady the soft flaps and lessen the tendency of the sutures, which oppose the raw edges of the flaps, to cut out.

In both of these methods the soft palate should be freely detached from the posterior edge of the hard palate before the sutures are inserted. This step is of the utmost importance. It permits the velum and uvula to drop towards the mouth and greatly facilitates the repair of the cleft without tension on the stitches.

The palatal muscles at the hamular process should not be divided by a tenotome as suggested by Ferguson. This procedure, formerly a good deal used, is not necessary in these modern methods, and may be disadvantageous to the patient.

The harelip should, as a rule, not be repaired until the palate has been reconstructed. If the palate operation is done in the early weeks of infancy, the parents will not be averse to postponing the operation on the disfiguring harelip until the condition within the mouth has been remedied.

CLEFT PALATE AND HARE-LIP.*

BY KATE WYLIE BALDWIN, M. D., PHILADELPHIA, PA.

Cleft palate fortunately is not a very frequent deformity; still, according to the most reliable statistics, one child in every eighteen hundred has some deformity of lip or palate.

Cleft palate is usually, but not universally, complicated by a fissure of the lip, which may be simple or double, complete or incomplete. Such deformity may be a slight central defect in the intermaxillary bone, with a small notch in the lip. A bifurcated uvula, or any degree between these slight defects, to one including all of the soft and hard palate and dental arch; with a projecting or in rare cases the complete absence of the intermaxillary bone. The skin of the lip may be united when the muscles are not. The cleft of the hard palate may be simple or double; if double the space is divided by the Vomer. A double cleft is not, of necessity, more difficult to close than a wide unilateral one.

I believe that Broca, Albrect and Czerny are justified in holding that the hare-lip fissure does not usually, as is generally held, pass outside of the incisor teeth, but between the central and the lateral incisors. An incisor may be wanting and the cleft appear to be next the cuspid. Occasionally, there may be supernumary incisors. Normally, the intermaxillary bone carries only the central incisors. When the fissure does pass between the lateral incisor and the cuspid it will be found that the nasal cavity is not opened. We may have a cleft of either the soft or the hard palate alone; either one with or without the hare-lip. A cleft due to disease may be of almost any extent. At this point consider the facial clefts for a minute. I shall deal only with the congenital clefts.

Although not frequent, cleft palate is probably quite as often met with as is any congenital deformity of equal importance to the individual. If not operated on, it is a constant reminder of defect, which must to a great extent change the disposition and general mental development of the child. An obturator, no matter how perfect it may be, does not obliterate the deformity; simply substitutes a mechanical for a natural part. Surgical measures may almost if not entirely obliterate the defect and the child forget it. It

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is for this reason that I urge that we resort to prothesis only after it is proven that surgery is of no avail. This will leave but few cases for an obturator, but in these few it is of inestimable value, and it is well that such useful ones were made before the surgical treatment advanced to its present even though imperfect stage.

Each individual experience has more or less determined the time and methods suited to secure the desired results with the least mortality. Different times and methods result differently in the hands of different operators. To a certain extent, each individual case is a law unto itself. Much depends on the general health of the patient and the extent of the deformity. If it prevents the proper nourishment of the child the deformity should be completely or partially corrected at the very earliest possible age; while delay even to adult life in some cases may be desirable. One surgeon claims success only if the operation be performed before the child learns to speak; another selects five to seven years as the most appropriate time; another after second dentition, after puberty. Still others say have the full co-operation of the patient—no matter at what age that may be. Some operate the day of birth on the lip, if not on lip and palate both. I find reported a successful operation for hare-lip and cleft palate on a child seven days old and one by Wolff on a man of fifty-two. Doubtless successful cases could be found at almost any age between these extremes. The earlier surgeons seldom attempted the operation in infancy. Many who formerly operated late now select the earliest time consistent with the general condition of the child. Others always advise mechanical appliances for all except the very slight deformities. Formerly Fillebrown of Boston, and others, gave preference to the obturator; while at present they decide for operation.

Success must include at least two things. Success surgically is of great importance, for without this we can not hope for perfect speech, which is of great importance, as it is speech like his fellow-men that makes much for the development of the individual. This, you say, may be accomplished by prosthesis. True it may be, but it does not remove the deformity, which is an ever present annoyance. Many a child does not speak distinctly even with a perfect palate. Defective speech is incident to many conditions other than cleft palate and hare-lip, so we must not be disappointed if perfect speech does not result after correction in this cause. Eliminate all causes as far as possible, and do not neglect the training, both before and after the operation.

In favor of early operation is given: Child more easily nourished; perfect speech more likely to result; palative arch not so high and more accessible; little or no anesthetic required; hemorrhage in young children always slight; elevation of mucous membrane and perichondrium easy; vitality of flaps distinctly greater; and union between surfaces much more apt to take place. Osteoclasis must be done under four years of age. Later the bones can not safely be forced together. A partial closure tends to narrow the remaining cleft.

In favor of late operation, the argument is that one has full co-operation of the patient; the tissues are stronger and better nourished; nutrition of the teeth not so likely to be interfered with. If the hare-lip has been closed early the cleft in the palate will be much



Fig. 1. Gutta Serena Plate worn before Operation and during Healing.

diminished. Early uranoplasty interferes with the complete development of the skeleton of the arch. There is much greater mortality under eighteen months. A. Jacobi is quoted as saying that tissues of the palate can not be operated on until the child is four or five years old, but that unless there be strong contraindications, the hare-lip should be operated on the first day of life when the immediate necessity of feeding is not urgent. If the cleft in the lip and palate is not to be closed at one sitting, but within a few weeks or months of each other, it is well to take the palate first on account of the added room and better view. If one must be left for years, operate on the lip first. At the present time the general opinion seems to be in favor of at least moderately early surgical treatment. Neglected cases will occasionally present themselves and advanced years alone will seldom bar surgical treatment.

In 1879 W. Fairlie Clarke writes: "If there is a large gap, the patient must be content to wear an artificial palate. The soft palate may in some cases be united and a plate used to fill in the hard palate." Another author says "that if mechanical closure is decided upon it is no good to unite the velum as it will of necessity have to be split open to make an obturator do its best work."

An obturator is not practical until after second dentition on account of imperfect anchorage and the necessity for frequent changes. The average time during which a Tubbs velum retains its usefulness is sixteen months. The worst record is four vela in two years; while the best is three in five years. The majority use about one velum a year. In 1881 Baker made his first successful appliance. As late as 1892 very pessimistic views of the surgical treatment of cleft palate were presented by those who preferred Kingsley's obturators and by others who gave preference to Svensen's appliances. Prothesis has been very thoroughly advocated, but the writers have entirely lost sight of the achievements of modern plastic surgery in the hands of many operators who have obtained ideal results. Price of Ann Arbor describes a method of reducing the cleft by means of a plate and spring.

Operation being decided on, where and how shall we secure sufficient tissue to close the space without tension. In children under four years of age, osteoclasia of one sort or another may be selected. I have seen severe shock and almost immediate death follow osteoclasia. It does not give superior results; often several operations being necessary. This operation requires much courage in one's convictions. For any operation the patient must be in good general condition and, when practical, should have some previous training and treatment. In some cases, if the patient is standing the operation well and there is not much loss of blood, the lip, hard and soft palate may all be closed at one time. It is good judgment not to extend the operation over too long a time, no matter what the immediate condition may be, as an unusual amount of shock often results. Wolff and others often operate in two stages. First mark out and elevate the flaps and leave them four days to control hemorrhage and improve nutrition. Wolff claims that the greatest mortality under eighteen months of age would be much lessened were more care taken to avoid loss of blood. Flap tissue has been and may be obtained according to the individual demands, from the remaining portion of the palate; the septum nasi, the inferior turbinal, the posterior wall of the pharynx, the side of the tongue, the forehead, lip

or cheek. That from the palate or septum is most frequently used. The flaps may be cut and manipulated in various ways. Make an incision parallel to the cleft, near the alveolar border through mucous membrane and perichondrium and through this elevate to the edge of the cleft, and well around the edge, especially at the junction of hard and soft palate, as by remembering this myotomy to give relaxation is almost invariably avoided. Freshen the edges of the cleft, slide over the flaps and unite the freshened edges with silk.



Cast No. 1. Hard Palate showing Cleft.

silk-worm gut, horse hair or silver wire—colored sutures are a great convenience. By using a slip knot first the edges are more easily adjusted and the knot is fixed by shot or a square knot. Sutures must be very close together, especially in the soft palate and uvula. A flap consisting of mucous membrane and perichondrium may all be taken from one side. Make an incision parallel to the edge of the cleft just within the alveolar border and dissect free to and around the free border, which is used as a hinge on which the flap, after being divided at the ends, is turned directly over, bringing the per-

condryl surface into the mouth. The free edge of this flap is then sutured between the split edge of the opposite side of the cleft. This method is much better adapted to the hard than to the soft palate. Parkhill uses a triangular flap, the apex on one side being front and on the other back. The flaps are elevated and slide over to the median line, where the freshened edges are sutured in the usual way. Another suggestion for flaps is to mark out a triangle on each side, the base being the edge of the cleft and the apex an imaginary point beyond the second molar tooth. The two sides of the triangle are connected just inside the alveolar ridge by an incision through the mucous membrane and perichondrium. Through this the tissues are elevated to and around the cleft. The ends are not divided, but the tissues slid over and in the median line united in the usual way.

Murray of Liverpool uses a button suture to bring up the flattened ala. For the same, Wyeth of New York advances the anterior portion of the upper jaw on the short side and secures it with silver wire sutures. He does this six to eight weeks before commencing work on the other parts.

M. Roux, in 1819, made the first successful operation for cleft palate. This included only the velum and uvula. J. Mason Warren of Boston was the first to devise an operation for cure of fissure of the hard palate, first published in 1843. Warren was also first to suggest dividing the muscles to relieve tension. Roux employed transverse incisions, for which Dieffenbach substituted incisions parallel to the fissure. I have gone over the literature quite thoroughly and wish to give due credit for all suggestions which have in any way contributed to the present, though perhaps still imperfect methods of treatment. After dentition the proper occlusion of the upper and lower teeth is of much importance. For feeding before or after operation a nipple with soft rubber wings, and the opening on the under side in place of the end may be used. Peck suggests a sounding board as a valuable aid in teaching a child to talk. One case of severe secondary hemorrhage is reported, caused by the child picking at the sutures. A few turns of plaster bandage will control the arms, or that which is better is a pair of small, straight sleeves, which prevent flexion at the elbow, but leaves free action of the shoulder joint.

The difficulties are many and even the slight defects require study, patience and surgical skill. Not in every case will good union along the full length of cleft be secured with the first operation. If a

stitch gives out, as soon as possible introduce another. Sutures in the lip should be removed the second or third day, and tension prevented by the use of adhesive plaster. In the hard or soft palate they may remain weeks if they are not cutting, and should be removed only one or two at a time. When necessary a relaxation suture may be introduced several days after the primary operation. Any point not inclined to close may be stimulated with nitrate of silver, compound tincture of benzoin or tincture of cantharides. Keep the parts as clean as possible by frequent douches. Prevent



Cast No. 2. Showing Results obtained after Operation.

talking. Feed with liquids or semi-liquids and in extreme cases by rectum. Keep the patient out of doors as much as possible.

The case I wish specially to report is that of Robert C., thirteen years and nine months old. A country boy somewhat under size. The cleft in the lip, which had been repaired when he was seven months old, must have been quite extensive, judging from the scar, which extended at the base of the lip nearly the full width of the nose, with a much puckered one at right angle to this, which drew

the middle of the lip under the left ala. This diminished the flexibility of the lip to such an extent that he moved it very little. Three teeth were missing and a wide triangular gap in the dental arch opened the left side of the nose, which cavity was one with the mouth, the hard and soft palate being completely divided. The septum, which was displaced to the right anteriorly, extended to and was united to the pharynx, dividing it into two distinct cavities, the left being one with the nose and mouth. An abnormally developed cartilage just inside the left vestibule enabled him to completely close that side of the nose when swallowing. The right vestibule was three-fourths closed by the deflected and thickened cartilage. The nasal and pharyngeal tissues were covered with crusts and purulent secretion. Hearing was very deficient, both ears being filled with necrosed epithelium, pus and granulation tissues. The nasal and oral secretion were very offensive. The upper jaw was broad and flat, the under jaw projecting much in front of it. He had long, bushy, red hair and wore a heavy, squeaky iron brace on the right leg and foot, they having been badly crushed by a railroad train when he was seven years old. Robert's was an exceptional case, for with all this handicap he had a sunny disposition and a mental development quite beyond the average boy of his age. Had it not been for this and the fact that he had received careful home training and was ready to assist me in every way possible, it would have been very hard to spend with him the time necessary even to hope for results.

For four months we devoted the time to all-around cleansing and disinfecting. During this time, I had this plate made so as to freely escape the roof of the mouth, as we hoped to have it after operation.

He became accustomed to it and was able to eat much better with than without it.

Cast No. 1 shows the condition of the mouth April 12, 1905, when under general anesthesia, produced by ether and continued with chloroform, with Wolff's instruments, I did a plastic operation, including the soft and all of the hard palate, except a small part anteriorly, which, if included, would have endangered the nutrition of the flaps. At the same time, I cut through the extension of the septum. The flaps were obtained from the palate and septum, the tissue being dissected free from a line just inside the alveolar ridge to and around the edge of the cleft on the left side and well up on the septum on the right. By means of the previously adjust-

ed plate, I was able to hold an antiseptic dressing in contact with the wound and at the same time protect it from the tongue and food.

There was quite free bleeding at times during the operation, but the boy was put to bed in good condition. Two hours later I was told over the telephone that there was some bleeding. I gave instructions and made ready to return to the hospital, when another report made me go at once. I found the patient in a very critical condition, no radial pulse and the lips and ears absolutely blanched. I quickly drew some packing up behind the palate and met it with some through the left side of the nose. This promptly stopped the bleeding. Tincture of iron, strychnine, hypodermoclysis, and at the same time normal saline solution and bovine by the bowel saved my boy. The resident surgeon had gone immediately to another operation, leaving the case with a nurse not alive to conditions. For several days we gave bovine by the bowel every four to six hours in addition to all the liquid and semi-liquid nourishment we could administer by mouth. The nose and mouth were thoroughly and frequently cleansed. For two weeks he spoke but once. At the end of that time he left the hospital and came to the office for treatment. Several times I did a little patching, which with stimulation gave complete union the full extent of the operation. Never despair! If a stitch gives out put in another, and put them very close together at first, especially in the soft palate and uvula. At one time, I thought it had entirely gone to smash, and the operation would have resulted in almost complete failure had I not at once gathered courage to put in new stitches.

Robert went home the first of July and returned December 4, much improved by his country outing. I now devoted my efforts especially to the ears, giving the teeth and jaws over to Dr. Aliee M. Norton, the dentist who had made the protecting plate. Dr. Norton gave much time and thought to the work and by various mechanical appliances was able to bring forward the upper and push back the lower jaw until the teeth occluded, and then put in a strong heavy bridge, carrying three teeth. The bridge and the change in the jaw closed the remaining part of the cleft and probably much better than I could have done at the time of the primary operation. My only regret is that I did not have the dental work done first. I thoroughly believe that after second dentition it would be wise first to put the patient in the hands of a good dentist accustomed to regulating and have the jaws brought into as nearly normal relation to each other as is possible, and held by some me-

chanical device until there is no danger of recurrence of the deformity. It will in many cases greatly diminish the cleft and improve the general condition of the mouth.

One stage of the dental work came near proving disastrous to the new tissue of the hard palate. Had the tension been exerted a few hours longer in one direction it would have completely opened the hard palate. I shall never again let the dental work come second, as so very much depends upon it. The discharge from the ears entirely stopped and he has about three-fourths normal hearing. The nasal discharge continued to some extent when he finally left town. The flexibility of the lip was much improved by dividing the puckered scar with the knife and the transverse one with the electric needle. The right vestibule was well opened by dissecting out the cartilage. Unfortunately, the suture holding the left ala in place gave out prematurely, and I did not consider it wise to operate again at that time. He bore perfectly well all the work on the palate and the regulating, but the instant I commenced work at the naso labial junctivi he became very faint, with irregular heart action and the radial pulse very weak or entirely absent. The heart gradually recovered itself, but he felt badly for several hours. The needeling of the scar at the base of the lip had the same effect, so that I was able to do but very little at one sitting. I find one similar case reported where work at this point caused irregular heart action. Had we been working under a general anesthetic, what would have been the result? Robert developed very rapidly the last six months he was under treatment and the nervous strain from the regulating was considerable. In a few years he may be able to stand having the nose brought up into better shape. He went home June 14 with the mouth in the condition shown by the last cast.

He was able to speak so that any one was able to understand him. He was readily understood over the telephone.

320 South Eleventh Street.

SUBMUCOUS PERINEURAL INJECTIONS OF ANESTHETIC SOLUTIONS IN THE NOSE.

BY PROF. GUSTAV KILLIAN, FREIBURG, i. BR.

Heretofore I have anesthetized the mucosa of the nose by simply swabbing the surface with the anesthetizing solution, except in cases of submucous resection of the nasal septum, when cocaine and adrenalin solutions were injected. These injections were made about the anterior edge of the vomer, and were intended to produce a bloodless field for operation rather than for anesthesia. As a matter of fact, the mucosa was anesthetized only as far as the submucous spread of the solution. The increasing frequency of producing anesthesia by injections in general surgery gave me the idea of using it in nasal surgery as well. The perineural injection appealed to me as an especially available technique because of the simplicity of the nerve distribution of the nasal fossae.

The septum operation offered numerous opportunities for experiment. A careful study of anatomical preparations showing the nerve distribution of the septum was necessary. The mucous membrane of the septum is supplied by two nerves, an anterior and a posterior. The anterior is the septum branch of the ramus ethmoidalis of the first part of the fifth nerve. It courses just below the bridge of the nose in a downward arch to the floor, and supplies the mucous membrane of the anterior half of the cartilago quadrangularis. The posterior branch comes from the ganglion sphenopalatinum of the second part of the fifth nerve. It traverses the upper margin of the choana to the nasal septum, and is here termed the nervous naso-palatinus Scarpae. It descends along the upper margin of the vomer from above downward and forward, passing through the canalis naso-palatinus. This nerve supplies the rest of the septal mucosa.

To anesthetize these areas, then, only two injections are necessary, the one antero-superiorly in the region of the nervus ethmoidalis, the other postero-superiorly in the area of the nervus naso-palatinus. The higher we apply the first injection, the larger the field of anesthesia obtained. The needle should be introduced just anterior to the tuberculum septi in an upward direction below the mucous membrane. Even a few drops of the injecting fluid are so widely disseminated that there need be no fear of missing the

nerve in this anesthesia. At no time are more than a few drops necessary for this injection.

The second injection is conducted in a similar manner. The course of the nervus naso-palatinus can be readily traced by locating the upper margin of the vomer. Locate an imaginary arch from the floor of the nose to the level of the upper border of the choana. This arch should rise posteriorly to the fissura olfactoria. If this point cannot be reached, the injection may be made more anteriorly, and at a point just below the middle of the lower border of the middle turbinate. The needle may penetrate somewhat farther backward and upward under the mucosa. Here, too, a few drops, suffice to anesthetize the nerve. To facilitate the injection in the deeper area, I use an especially long hypodermic needle which has been made for me by Fischer of Freiburg. This needle is arranged at an angle to the axis of the syringe. For the injection we use a solution made by dissolving two tablets of suprarenin-cocaine (Braun—form A) in 5 c.c. of sterilized physiological salt solution. These tablets may be obtained of E. Pohl, Schoenbaum, Danzig, Germany.

In five to ten minutes the entire septum area limited by the points of injection is anesthetized, as can be determined by the probe. There is seldom difficulty in applying the injection in the concave side of deviated septa, but occasionally the convex side presents some hindrance to the technique, and where unusual deflections exist it may be possible to reach the mucosa above the site of the deflection. The area that cannot be reached in this manner by injection can be anesthetized in the usual way by swabbing. The above consideration applies only to the deeper injection. In order to avoid misunderstanding, I mention that I do not omit in any case the injection anteriorly below the vomer. All together, I make three injections on each side, and produce thereby a complete anesthesia. Tests made during the last six months have proven this to be a valuable method.

In a similar way, I have endeavored to anesthetize the lower turbinal, which is very easily accomplished. Here, too, an anterior and posterior injection is necessary. The anterior injection is made about the point of the lateral branch of the nervus ethmoidalis, and the posterior over the branch of the lower turbinal, namely, the ramus nasalis posterio lateralis, being a branch from the ganglion sphenopalatinum. The point of the first injection is located somewhat anterior to and above the anterior end of the lower turbinal;

the point of the second injection is over the posterior end of the lower turbinal. The point of the first injection is easily reached; the second is somewhat difficult and occasionally impossible of access. In the case of the lower turbinal, however, anesthesia produced by swabbing the surface is a more practical measure, in the first place, because this posterior area is so difficult to reach; and secondly, because toxic symptoms are readily produced even when but a few drops are injected into the lower turbinal. An increase in pulse, blood pressure and in some cases secondary hemorrhage, very frequently result from the deep injection in the turbinal.

I have successfully anesthetized the mucous membrane of the maxillary antrum by submucous injection in the area of the middle meatus of the nose. As the development of the maxillary antrum can be traced to the area of its ostium, it is reasonable to assume that the nerve supply of the antrum also finds passage through the ostrum. Our object, then, is to produce a satisfactory injection in the area of the ostium maxillare, namely, in the area of the lower part of the infundibulum, about the processus uncinatus and behind it. I use this method in the radical operation of the maxillary antrum, together with injections made through the mouth over the anterior wall of the maxillary antrum. I also add to this an injection in the nose above the anterior end of the lower turbinal.

Formerly we proceeded similarly, but without the injection in the nose. The mucous membrane of the maxillary antrum was swabbed with cocaine from the mouth through the wound, but this did not always produce satisfactory anesthesia. Since the injections have been made in the area of the ostium maxillare, the results in a large series of cases have been very satisfactory. The mucous membrane of the antrum was but slightly, if at all, sensitive. Here and there a small area was found which was possibly supplied by some accessory nerve. In such cases, swabbing with cocaine solution through the wound must be added. The radical operation of the maxillary antrum by local anesthesia originally performed by Dr. Karl von Eicken in my clinic (see *Heidelberger Laryngologen Versammlung*, 1904), has been materially improved since using the intra-nasal injection to produce anesthesia of the antrum mucosa. This method is decidedly preferable to general anesthesia when dealing with reasonable patients. I would add in conclusion that we use the Luc method in operating, and make a large fenestrum in the region of the inferior nasal meatus.

THE PROBLEM OF ASEPSIS IN THE ROUTINE OFFICE WORK OF THE LARYNGOLOGIST.*

THOMAS HUBBARD, M. D., TOLEDO, OHIO.

It would be futile for any one to attempt to detail a perfect aseptic system adapted to all of the varied requirements and facilities of laryngologists. Our special art is developing rapidly to a place of importance and recognized scientific accuracy, but I believe we have been remiss in not applying the fundamental principles of asepsis demonstrated in the general art of surgery to be essential and practical. But I should add as an offset to this criticism that there are undoubtedly enough of applied aseptic hobbies in the practice of a group of laryngologists to make an ideal system. Throat and more particularly nasal surgery test the merits of aseptic technique but of necessity a paper of this character must consider routine treatment, for it may be stated as a positive conclusion that where routine treatment is conducted without particular regard to cleanliness there aseptic surgery is not possible. In other words, a most important factor is to have a clean workshop. A perfect surgical equipment may become hopelessly contaminated by carelessness in routine treatment and on the other hand a very simple and homely outfit may, with care, be kept so very clean that the best of surgical requirements obtain. The laryngologist who develops a particular system of operation naturally becomes attached to the special kind of illumination, his instruments in place and handy, and all this inspires a confidence to meet emergencies. This is a factor in the persistence with which most of us cling to the practice of doing surgery in the office rather than in the hospital. But I have no doubt but that another decade of progress will find many more laryngologists doing all of this important work in specially equipped hospitals. This is ideal and will solve the problems which at present bother us not a little.

In an address recently delivered, a distinguished surgeon had occasion to lament the growing evil of what he termed "assaults on the abdomen by untrained operators," and in the course of his

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remarks defined *surgical training*. Two years at the elbow of an experienced operator and under the constant supervision of many critical eyes establishes a system of technique that becomes a fixed habit and leaves the mind free to grapple with the real surgical problems as they develop in the course of the operation. It is to be expected that the influence of the "trained surgeon" will be more and more an important factor in the progress of laryngology, rhinology and otology and that a higher standard of aseptic technique will obtain. But today we are doing the most of our work in office operating rooms, at best not perfect in surgical requirements, and it is well that we occasionally confer as to methods of eliminating certain faults in the routine of treatment and operating.

The office equipment of the laryngologist is peculiarly liable to become contaminated by pyogenic germs and the danger of indirect transmission of contagious diseases is apparent. The evidences of accidental infection are not of positive and clearly demonstrable character, but I think that all operators have experienced anxiety over cases having symptoms of severe local sepsis, and still more often do we see delayed healing not accounted for by defective operation. Reports of lamentable results of surgical infection are not rare. In such instances, a careful study of the details of technique is in order and this paper is in part a compilation of faults that I have observed in my work and equipment.

A floor covering that will stand daily scrubbing, *sanitary plumbing*, and *fountain cuspidor*, etc., are recognized essentials; and I may say in passing, that, considering the general character of our work—the predominance of cases having acute or chronic transmissible diseases—it is of importance that the operating room be of generous size and especially *well ventilated*. This we owe to ourselves as well as to our patients.

An abundant supply of *sterile water* is important. *Antiseptic solutions* as a means of sterilizing instruments should be entirely discarded for this practice cannot but be regarded as a mere pretense at cleanliness. When one considers that it takes nearly 20 minutes to sterilize a clinical thermometer in bichloride 1-500, or carbolic acid 2%, the futility of this practice is apparent. *Instruments must be boiled* for at least 10 minutes to insure surgical sterilization, and I would emphatically include atomizer tips and the bulb tips of the Politzer inflator. For this purpose the removable tip is desirable, as made by DeVilbiss, that it may be cleaned and boiled as any other instrument.

To protect *complicated cutting instruments* from the destructive effects of unnecessary sterilization, I have adopted the method of cleaning and boiling *after* using, and then wrapping in *gauze* and *paraffin paper* (the same having been cut of proper size and sterilized in alternate sheets). This keeps instruments bright and rustless, and further, in emergency, it is very convenient to avoid the 10 minute delay necessary for sterilization.

Solutions to be used in the atomizer can be kept sterile in a closed receptacle having a four-candle power electric lamp. The one that I use maintains a temperature of about 160°.

The *cutoff* and *tubing* should be protected by a gauze covering—one made like an abbreviated umbrella cover is easily adjusted, and of course the renewal should be a part of preparation for every operation. Operator and assistant should use rubber gloves and gown if the occasion demands it.

We are now fortunate in being able to procure *syringes* for nasal, post-nasal and ear irrigation that can be sterilized by boiling. The *asbestos packing*, as perfected by Ermold, N. Y., is the most satisfactory and its use eliminates one very prevalent defect in our routine treatment as well as in operations. The *laryngeal mirror* can be boiled for a short time. The *head mirrors* can be covered with one thickness of sterile gauze without reducing illumination perceptibly, or a metal clip can be used for manipulating it. I have experimented with *whalebone bougies* and find that they stand boiling for a half minute, which removes oily material, and they can then be immersed in carbolic acid 4% without impairing elasticity or smoothness, but it should, of course, be borne in mind that all instruments of this character, however cleaned, become brittle in six months (more or less) of service, and should always be tested before using. In fact there is no excuse for using any instruments that cannot be surgically sterilized, that is, cleaned and boiled.

A very satisfactory substitute for the *gauze handkerchief* (which may be more desirable in operations) is a *paper napkin*, made in this country (Dennison & Co., New York), and concerning which I have made some investigations. In the process of manufacture an absolutely sterile article is produced and the makers have assured me that in the subsequent preparation for the market, the work being done by machinery, there is little or no chance of contamination. Culture tests, maceration in bouillon and incubation for 48 hours showed that the samples taken from broken packages were practically sterile.

The steam sterilizer is an absolute necessity in every office—one that subjects contents to live steam heat and dries by superheated air. I have applied the *small test tube* method of sterilizing gauze for nasal operations and find it practical to prepare in small rolls, enough for one ordinary packing in a tube.

The operators' hands will, of necessity, come into more or less frequent contact with the patient's face and as a routine procedure there should be a thorough washing of face, or as some operators prefer, a partial mask may be applied. I have found the *clip* and *elastic band* used by dentists to retain the rubber dam very satisfactory for the purpose of retaining the gauze mask.

The sterilization of the *mucous tract* to be operated upon, and of course most of these details refer to intranasal operations, should be attempted, and the most rational process is an adaption of the method used by gynaecologists in sterilization of the vagina. An irritant like boric acid in sterile water, or a dilute Dobell's solution, or glycerine tampons, excite a copious flow of sero-mucus which flushes out the glands and recesses of the mucosa effectually and then by spraying or irrigation a fairly sterile field is assured, excepting in cases having suppurative conditions or atrophic areas. The reactionary flow of sero-mucous, following operation and subsidence of local anaesthesia and ischaemia, is a most important aid in prolonging the aseptic condition, and this is one reason why a too firm packing should be guarded against—the mechanical pressure preventing the saturation of dressings with the normally aseptic secretion.

Sterilization of the *throat* should be preceeded by careful attention to the cleaning of the teeth and mouth, followed by antiseptic spray and gargle, but at best we can only try to remove superficial deposits. It is not practical to attempt a cleansing of the naso-pharynx, before or after operation, the danger of infecting the middle ear being very great, and especially in children in whom the lumen of the tube is proportionately larger than in adults.

The *quality* of *air* used under compression for atomizers and direct inflation deserves special study. The location of the intake tube should be given attention with the purpose of getting air as free as possible from dust and odor. As a rule it is best to have the intake tube near the ceiling of the operating room—supposed to be the cleanest of all—and even when so placed if the experiment will be tried of capping it with a large ball of cotton a few weeks experience will demonstrate the advisability of filtering the air.

Air tanks and pumps are not specially cleaned before being set up and the contents often have a disagreeable odor. To purify the tank pour in a few ounces of essential oils (cinnamon, cassia, or peppermint), which will impart to the air a pleasing, aromatic odor, and at regular intervals saturate the cotton at the intake with formaldehyde and allow the pump to run, valves all wide open, until all traces have disappeared. As to the importance of all this attention to the quality of air in the compressed air-tank there may be a wide divergence of opinion. That the tank becomes a reservoir for the accumulated dust there can be no doubt, as sedimentation must take place in the absence of disturbing air currents and with years of service there must be a considerable deposit.

I have had made culture tests, using agar Petri dishes and slants to determine whether or not the dust that accumulates in the tank is carried into the exit tube and escapes in the air current.

Exposures were made under varying conditions—the air from a tank long in service and that from one recently set up—with control tests of the air of the room, and the only conclusion that could be drawn is that the air from the tanks is in a measure freed from dust by the process of sedimentation within the tank, but there is also a difference in result depending on the kind of cut-off used. One that simply compresses the rubber tubing when wide open gives a free lumen and large volume of air and more accumulated dust escapes than obtains with the piston cut-off which allows only a small stream of air to escape, and does not agitate the main body of air in the tank or tubing.

Although experiments along this line are of little value in determining the purity of the air used in atomizers and for direct inflation, and I present them with no claim to scientific accuracy, yet I feel justified in thus calling attention to the ease with which the air drawn from almost any source can be rendered surgically clean and safe for use at any stage of an aseptic operation; and also the facility with which we can prevent the contamination of the solutions in atomizers in so far as the compressed air is concerned. *Dry cotton filtered air in a tank kept as clean as possible by occasional use of vapor antiseptics should be a feature of every well-ordered office operating equipment.*

In closing, I will say that I trust that this paper will be taken for what it pretends to be, i. e., merely a compilation of suggestions for the promotion of surgical cleanliness in routine office treatment and special operations. The surgeon, in whatever special field or

working environment, must constantly bear in mind that only by high ideals in the refinement of cleanliness, in theory and practice, can he expect to stimulate his associates and assistants to the proper discharge of their part of the work.

The fact that the individual is immune to the ordinary bacteria that inhabit his respiratory tract has cultivated in the profession a degree of carelessness bordering on indifference, but it is none the less a surgical misdemeanor to introduce foreign germs, and this can be guarded against only by the development of a thoroughly consistent and practical system of surgical cleanliness in routine treatment and office surgery.

205 Ontario St.

Local Anaesthesia in Ear Surgery. H. NEUMANN *Deutsche med. Wchnschr.*, April 12, 1906.

The author justifies the use of local anaesthesia for ear operations, as described by him, by reviewing the anatomical arrangement of the nerve supply of the external ear.

The injection for middle-ear operations is made into the upper canal wall; for mastoid operations, under the periosteum of the mastoid bone; for the radical operation both injections are combined.

YANKAUER.

OCULAR DISEASES OF NASAL ORIGIN.*

BY JAMES ALLEN PATTERSON, M. D., COLORADO SPRINGS, COLORADO.

The immense strides made in Ophthalmology and Rhinology in recent years, particularly rapid in Rhinology, has kept the independent worker in these specialties so busy apparently that the interdependence of nasal and ocular maladies has been partially lost sight of. Even now, as well known as is the relationship of lachrymal diseases to nasal disorders, we find nasal treatment largely neglected.

As a student in Ophthalmology, I observed that a metal canula introduced into the sac and down the duct into the nose through which boracic solution was syringed, gave in many instances better results than simply probing the duct. It was surely a painful method of nasal irrigation.

I am not ready with sufficient data to prove an assertion that the majority of cases of lachrymal abscesses are of ethmoid origin; but the fact that in so many of these cases an attempt to probe the duct will disclose roughened bone and that unless great care and skill are exercised the probe will enter the nostrils behind the duct through the ethmoid cells rather than through the lachrymal passage makes my belief tenable. I do not assert that we do not get some catarrhal conditions carried from the eye downward, but I am strongly of the belief that conditions of this sort are in the minority.

It has been my habit where a conjunctivitis is complained of and the conjunctival congestion is largely in the lower lids rather than the upper or the bulbar conjunctivae, to suspect the lachrymal passages and still further the nose of being the focus. Only a few weeks ago I had a striking example. I was consulted by a lad of 14 years, who came for conjunctivitis of the left eye only. There was hyperæmia of the skin of both the upper and lower lids, the patient being of a florid complexion made such more noticeable. The unilateral conditions led me to suspect a foreign body, as the complaint was of only three or four days' duration. Search for such was negative. I was, however, impressed by the fact that the

* Read at the Meeting of the Western Section of the American Laryngological, Rhinological and Otolological Society, Denver, February 16, 1907.

congestion of the conjunctivæ was confined almost exclusively to the lower bulbar and lower palpebral conjunctivæ. Further questioning elicited the fact that there was pain of this number of days standing limited to the left brow, temple and less severely the malar eminence. A further history of rhinitis of a week's duration was obtained. Examination of the nose showed bogginess of the middle turbinate, and after cocain and adrenalin dilatation, pus was seen coming from the neighborhood of the left ostium naturale of the antrum. Drainage and irrigation soon cured pain, conjunctivitis and catarrhal conditions. The patient had enlarged tonsils and adenoids which were subsequently treated surgically.

Vieusse¹ and others believe that tuberculosis of the conjunctivæ sometimes arises from extension of the unrecognized nasal tuberculosis.

I think we are only in the infancy of our knowledge of the causative relationship of the nose to some forms of keratitis. At least, those of us who have had our hard knocks treating phlytenular keratitis in the young are impressed with the fact that we had better not neglect the nostrils unless we take the chances of having our reputations injured. I have had, as you no doubt have had, the most brilliant cures in this malady following an adenotomy with or without tonsillotomy, and I believe I cannot urge too strongly the necessity of thorough nasal exploration in all forms of recurring keratitis.

A few days ago I did an iridectomy for optical purposes on the left eye of a boy of 16 years, who had very large tonsils. It was necessary to give a general anesthetic. Permission to remove tonsils a few weeks before the operation on the eye was refused. Anaesthesia was induced only after a long preliminary struggle. Twenty-four hours after the operation five punctate superficial ulcers appeared upon the unoperated eye and subsided in twelve hours under argyrol and iodoform ointment. Forty-eight hours afterward the disease reappeared in the same eye, although the distribution of the areas was different, this subsided in twelve hours under the same treatment and did not recur when daily spraying of the nostrils with a simple saline solution was instituted. The nose had been treated daily for a week previous to the operation in order to prevent any complications.

I believe the case reported by Schneideman² in 1904 of Central Superficial Choroiditis of one eye only, to have been due to pent up sphenoidal secretions discovered when pus was found to be flowing

from that sinus; the choroiditis as reported rapidly improving from that time. It is a most difficult thing to exclude as a non-focal point a sphenoidal sinus which is not discharging, and in many such instances not to be reached by a probe without previous surgical removal of a middle turbinate.

Schmieglov⁸ has recently reported "two cases of Retro-bulbar Optic Neuritis due to Sphenoidal and Ethmoidal Sinusitis."

The literature of asthenopic symptoms, contracted fields, affections of extra ocular muscles, pupillary changes, etc., have been gone over so well by Posey⁴ that it is useless to repeat them.

The pathology I believe to be one of absorption from diseased conditions in the superior and middle meatus of the nose, the anatomical reasons for which I have previously set forth in an article "Concerning the relationship of Nasal Disorders to Vitreous Opacities." I wish I could have illustrated that article with the excellent cuts of the "Arterial connection between the nose and its accessory sinus," and the illustration from Zuckerkandl which C. R. Holmes⁶ has made use of in a monograph, "Head Pains and Eye Symptoms caused by Inflammation of the Accessory Sinuses of the Nose."

Dr. Holmes has well said that "lowered blood pressure and slower circulation (during sleep) * * * cause the secretions" of the nose to flow more slowly, and favor inspissation, and that "decomposition is constantly going on." It is really wonderful how well the eye is protected from the diseases that immediately surround it. Its bony envelope, its elevation above the nasal cesspool and its arterial supply from the deep carotid rather than from superficial trunks make it a veritable Port Arthur. Yet, like the Russian stronghold, prolonged siege will make inroads. My previous observations above noted have shown that when there is good drainage from any of the accessory sinuses the deeper tissues of the eye are comparatively free from attack, but even a small focus of pent up secretions and their decomposition will make inroads upon its integrity, either by erosion of its bony envelope, extension by contiguity or absorption, as previously stated. Ziems theory of "passive orbital venous Stasis," as pointed out by Manning Fish⁷ in a very large and most interesting series of cases of "Uveitis due to Accessory Sinus Diseases," is admitted, but this must account for cases showing the more acute symptoms of pain, more or less severe, of rapid rather than sluggish onset, together with the accompanying symptoms, such as accommodative disturbance. Its continuance favors absorbtion of peccant material.

In all cases of unilateral ocular maladies the nose should never be forgotten as possibly being able to furnish evidences of the cause of the disease.

Strader of Cheyenne^s has recorded a case of glaucoma markedly benefited by treatment of the nostril of the corresponding side by suction methods. I have verified his findings in relieving cases of acute sinusitis by this method. Frank E. Brawley has devised an ingenious instrument for the purpose.

I desire to report the following cases:

CASE 1. This case is briefly reported to the Colorado Ophthalmological Society.^o J. K., age 39, a railroad section boss, was first seen in June, 1905. He had entered a general hospital some few weeks before, where he was said to have been treated for severe neuralgia of the head. The pain being most intense in the right temple and so severe as to prevent sleep. Eventually proptosis 3 mm and diplopia occurred, when Dr. E. R. Neeper saw him, who found at that time T+1. As there was a suspicion of their being a nasal complication, I looked over the case with Dr. Neeper.

At this time, June 23, O. D.v 5/10, O. S.v 5/5. Tension had fallen to normal under pilocarpine collyria prescribed by Dr. Neeper. There was a mild papillitis of the nerve of O. D. with fine flame-shaped exudations radiating from the nerve up, in and down, the media was, possibly, slightly hazy. The eye ground of O. S. was in health. He is unable to move O. D. out beyond the middle line and the movement in was possibly slightly restricted, he had full movement downward, but the ability to turn the eye upward was materially interfered with. Proptosis from my scale, 8mm.

Under cocaine I curreted the ethmoids seemingly as far back as they extended, the tip of the curette entered 9mm from the floor of the vestibule both frontal sinuses transilluminated clear. It was impossible to probe the right owing to a deflected septum.

Pain speedily lessened after this drainage and the proptosis gradually subsided. Five days afterward vision was 5/5, the papillitis was subsiding and the media much clearer; diplopia homonymous with R. H. 6°. July 15 my notes give: v=5/5, papillitis had subsided and proptosis not noticeable. Diplopia complained of only on looking to his extreme right.

Several currettement were made of the ethmoids and when last seen, on August 15, the v=5/4, eye grounds were normal, diplopia only on looking to his extreme right. The patient returned to work though there was still pus flowing from the ethmoid cells. Consent to further operative procedure was denied.

CASE 11. J. J. C., male, age 38, was first seen on April 28, 1904, presenting oedema, and redness of the skin above the inner canthus of the right eye. The case had been treated as erysipelas for some

days. This abscess was incised and pus liberated. The case did not return until the following July 16, when there was found a sinus at the point of my incision through which a large amount of pus had discharged daily. Pus was found in the middle nasal meatus which was occluded by a polypus. Transillumination showed a faint shadow in the lower part of the right frontal sinus with light transillumination of the right maxillary antrum a trifle less than that of the left. O. D. was then in health. Operation was advised but consent to it not obtained.

This case was not seen again until December 17, 1906. The sinus previously described remains although the amount of pus coming from it was much less. A probe enters 25mm by carrying it backward and upward at an angle of 30°. Middle turbinal is enlarged and polypoid. No pus could be obtained from the frontal duct.

He gives a history of great pain in O. D. for the past year, sufficient at many times to keep him awake at night. During this time, the sight in this eye has declined to light perception only. The cornea is now uniformly opaque nothing, not even the iris, can be seen through it; there are some fine vessels upon its surface; the conjunctive is white T. N. Vision in his left eye is 5/3. A pathetic evidence of neglect.

CASE 3. A lad of 14 years consulted me a week ago for pain in the left eye, the entire frontal region and left temple. This was accompanied by intense photophobia of the left eye with some lachrymation. He was unable to attend school for the past two days owing to the discomfort and inability to use his eyes. No foreign body could be found nor any form of corneal disease, the lower conjunctival cul de sac was distinctly congested the right to a very much less degree; there was no pus in the eye. The lids had agglutinated the night before. He has worn satisfactorily and comfortably for five months the astigmatic cofrection $+0.75$ cy ax 90 in each eye, which gave him normal vision, the eye grounds were in health. History of a mild rhinitis of three or four days duration was learned.

In the left nostril, after prolonged exploring, muco-pus was liberated from the anterior ethmoid cells. Pain in his eye ceased while he was in my operating chair, the headache continued and was not relieved by suction. The next day muco-pus was flowing unobstructedly in limited amount, coming down between the middle turbinate and the outer wall. All pains complained of had ceased, photophobia and lachrymation had disappeared.

CONCLUSION.

You will remember that some years ago the progress of otology was hindered by not having the nasal source of its many diseases treated as well as now. I believe that ophthalmology, while far less

dependent upon rhinology, can learn much to its advantage by the interdependence of the two special practices.

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805 N. Tejon St.

Mouth Cleanliness. M. A. SMALE (London). *St. Louis Medical Review*. Sept. 29, 1906.

Smale's paper is of main importance to dentists, but is of value to all physicians. He concludes that:

1. The mouth is the best breeding place possible for bacteria.
2. That even with all one's natural teeth, it is practically impossible to keep the teeth surgically clean.
3. That fixed bridges, no matter how beautifully they are made and fitted, can never remain aseptic in the mouth whatever anti-septic washes or tooth brushes and powders are used.
4. That removable bridges or dentures are the only justifiable methods of replacing lost teeth.
5. That, speaking generally, it is unjustifiable to cut up or destroy sound teeth for the purpose of using them as abutments for bridges.

EATON.

A CERTAIN PHASE IN THE DIFFERENTIAL DIAGNOSIS OF TUBERCULOSIS AND SYPHILIS OF THE UPPER RESPIRATORY TRACT.

BY LEE MAIDMENT HURD, M. D., NEW YORK.

It is not my purpose to differentiate in parallel columns syphilis and tuberculosis as they appear in the upper air passages, for it would take too long and be detail *ad nauseam* before such an assemblage. I only wish to call to your attention certain conditions which are confusing to both the microscopist and the clinician. Inflammations and ulcerations which may clinically closely resemble either syphilis or tuberculosis, or perhaps neither. The correct diagnosis in these cases is of much importance for the patient's peace of mind and future welfare. More than likely some of the reported cases of cured laryngeal tuberculosis have been syphilitic.

This short article was prompted by the following three cases:

CASE 1. Mary K., age 25; servant; native of Finland.

Noticed nasal obstruction about one year ago, which gradually grew worse. The fact was elicited that there was some pain in nasopharynx and across bridge of nose before she noticed the nasal obstruction. Other than this there were no local or general symptoms, and to all appearance she is in the best of health.

There is no family history of tuberculosis, or any tubercular people in the family in which she is employed. On examination of the nose and pharynx, a growth occupying the vault and posterior wall was found with a slightly nodular surface covered with mucous membrane of normal color and appearance. I removed the growth with forceps and submitted it to Dr. Jonathan Wright, who reported as follows:

"Microscopic examination of a piece removed by forceps shows that in mounting the hardened specimen crumbled from the hardening process. Many of the fragments show very plainly perfectly typical tubercle. Centres of tubercle granulum or necrobiosis are surrounded by a rim of new connective tissue in attempts at repair. In a few of these areas may be seen a typical Langerhans giant cell. Some of the round cell tissue apparently at a distance from the tubercles is altered somewhat by chronic inflammation and contains no lymph nodes. The tubercular tissue, or rather the tubercle granula, are not immediately under the epithelium which is fairly normal columnar, but separated from it by a rim of lymph cells. This is the second case only which I have seen in which there

were multiple tubercles in a posterior lymphoid hypertrophy, the other having been from the service of Dr. Chappell and reported by me with a color plate in the *New York Med. Jour.*, Sept. 26, 1896. Perhaps, owing to the scantiness of the lymphoid tissue, there being no nodes, it is not accurate to call this tubercle of the adenoid, but of the naso-pharynx.

"A search of 10 sections failed to reveal any tubercle bacilli."

"March 15, 1906. Two guinea pigs inoculated.

"June 6th, 1906. One of the Guinea pigs inoculated two months before with pieces of the growth removed from the naso-pharynx beneath the skin of abdomen showed enlarged inguinal glands. The other Guinea pig showed beginning round celled infiltration (presumably tuberculosis) of the smaller bronchi."

J. WRIGHT.

Although latent tuberculosis of the lymphoid tissue in the vault is not an infrequent occurrence, a purely tubercular growth like this I believe to be unique. This patient made an uninterrupted recovery.

CASE 2. G. S., aged 57, U. S. brass worker; married. June, 1906. Family history is clear. Previous history, usual children's diseases. Denies both gonorrheal and syphilitic infection, although he says he has lead a wild life, and could very well have been infected. Seven months ago he gradually became hoarse without cough or other symptoms. He states he has had previous attacks of hoarseness, which have disappeared of their own accord. The lungs are normal. Repeated examinations of sputa fail to show tubercle bacilli. On examining the larynx, we find ulcerations along the posterior two-thirds of right vocal cord and posterior one-third of left cord. The laryngeal mucous membrane is slightly congested. The ulcerated area is covered with a white exudate, and the ulcerations are not very deep; the edges do not seem undermined.

A section was removed and sent to the Pathological Laboratory, and Dr. Jonathan Wright reported as follows: "The specimens on section show areas of coagulation necrosis, and in them or near them typical Langerhan's giant cells and epithelioid cells. Subsequent sections were examined for tubercle bacilli, but none were found."

Dr. Harlow Brooks, who saw the same section, reported as follows: "The coagulation necrosis is rather less definite than is usually the case in tuberculosis. There is general hyperplasia of the connective tissue with thickened arterial walls, with periarteritis most marked. Inclines me to think it is syphilis."

This case was injected with salicylate of mercury, gr. 1, weekly, for nearly six months. Potassium iodide was prescribed, but I doubt if it was taken regularly. For the last six months the ulcerations have been entirely healed, which shows beyond doubt that it was syphilitic. He was under mixed treatment several months before the ulceration showed any tendency to heal.

CASE 3. L. W., age 45; male. Gives negative family history. Previous history of syphilis twenty years ago. Is an alcoholic. Several years ago, while drinking to excess, he had a cough with slight night sweats. He has had no cough or night sweats for three years. Four months ago he became gradually aphonic. Two months ago dyspnoea developed which has steadily increased until at present he labors considerably for air. On examination the lungs and heart were normal. No syphilitic scars in nose or throat. His larynx contains so much thickened and inflamed tissue that the merest chink remains for breathing. The false and true cords are greatly thickened, with ulcerations on the true cords; also considerable subglottic infiltration below left cord with an ulcerated surface. The ulcerations did not appear deep, or have undermined edges.

The laryngeal mucous membrane was deeply congested with some mucous secretion. I made a clinical diagnosis of syphilitic infiltration with ulceration. Dr. Wright was inclined to the same belief, but thought it might be malignant. The patient was admitted to the Manhattan Eye, Ear and Throat Hospital, and placed upon mercurial injections and potassium iodide in large doses. This was changed at the end of a week, at the suggestion of Dr. Wright, to bichloride and potassium iodide by mouth. The third day after admission a tracheotomy had to be performed. The mixed treatment was continued for five weeks without apparent effect upon the laryngeal condition, except that dyspnoea decreased somewhat. He wore the tracheotomy tube most of the time and the rest that this gave the larynx may account for the improved breathing. The secretion from the tracheotomy tube was repeatedly examined for tubercle bacilli without results, and a portion of the growth was removed from over the left arytenoid and examined by Dr. Wright, who reported as follows: "The epithelium is flat, undergoing great hyperplasia and dipping down with the stroma in all directions, there being in these sections some separate islands of it. It is sharply differentiated from the stroma and has no appearance of malignancy. In the stroma are large areas of necrosis of tissue, containing giant cells of Langerhan's. So far as these appearances go, we are compelled to assume the presence of tuberculosis, though there are some thickened nasal walls which remind one of syphilis."

Dr. Harlow Brooks, who has examined the same slides, states that microscopically it looks like tuberculosis.

After remaining five weeks with us, he was transferred to the City Hospital, with a note from Dr. Wright stating that he was inclined to believe the case tubercular. At the City Hospital his sputa was repeatedly examined without results, and he was discharged at the end of three weeks, when he again reported to the clinic. I found his laryngeal condition considerably improved; the thickened tissue had gone down about 50%. He had received no medication while in the City Hospital. He then went on a spree, and I have not seen him since. He may have developed Laryngeal Edema and died.

I attribute his improvement to the mixed treatment that he had before going to the island. His tracheotomy tube was corked all the time that he was there, so we cannot say that the improvement was due to rest of the parts. The improvement in this case was most marked, and leaves little doubt in my mind that if treatment had been continued long enough the laryngeal condition would have been completely cured.

Dr. Eugene Hodenpyl, who examined the slides from these cases, January 2, 1907, reports as follows:

"I have examined microscopic slides of your cases: To be brief, each case, I think, presents in a fairly typical fashion the morphological character of a tuberculous lesion."

Certain phases of syphilis of the mucosa are histologically identical with tuberculosis. I refer to those in which there may be easily demonstrated under the microscope a number of giant cells. These giant cells do not seem to differ in any way from the so-called Langerhan's giant cells.

Given an area of chronic inflammatory action of the mucosa, crowded more or less with round cells, whether there is any surface loss of epithelium and consequent ulceration, or not, the pathologist must be careful in making an unqualified histological diagnosis of tuberculosis, because in every field he sees one or several giant cells.

The presumptive diagnosis, whatever the clinical history, should be syphilis when the marked vascular thickening and the number of giant cells are out of all proportion to and more prominent than the coagulation necrosis, unless the tubercle bacilli can be demonstrated in the tissues.

It is true that giant cells are much more often found in tubercular than in syphilitic foci of chronic inflammation, but when they do occur in syphilis they are much more numerous than is usual in tubercular cases.

I refer especially to swellings and ulcerations of the mucosa, granulomata, not large gummata or extensive tuberculous softening like lymph nodes. Tertiary syphilitic processes of the upper air tract are usually destructive, often invading the bone; the granulomatous infiltrations of the mucosa are of less frequent occurrence.

Manasse (*Virchow's Archiv.* 147, 1897) states that the presence of giant cells or of miliary nodules containing the giant cells is not positively available in the determination of the question as to syphilis

or tuberculosis. These features being sometimes present, sometimes absent in either disease. It is hardly necessary to mention that caseation and other degenerative processes occur in syphilis as well as in tuberculosis, and that the presence or absence of these retrogressive metamorphoses does not constitute a distinctive sign between these two diseases; neither is the production of connective tissue which leaves familiar scar formation, a reliable sign, as it is also found in fibrous tubercles, etc.

Arteritis, leading to vascular obliteration, is often quoted as a characteristic feature of syphilis, and as a matter of fact, this condition is almost constantly found. However, this vascular change is not entirely conclusive, for it is met with in tubercular conditions as well.

The giant cells perfectly resemble Langerhan's giant cells met with in tuberculosis. Certain authors claim that the giant cells originate by individual growths from a single cell; others, that several cells are concerned in their growth. The general tendency seems to be to regard them as cross-sections of pre-existing channels, either vascular, lymph, or glandular, on account of their parietal nuclei. But whatever their true origin, it may be assumed as a foregone conclusion that it is the same in both tuberculosis and syphilis.

The only conclusion that can be drawn is that the microscope and the clinical picture cannot be unqualifiedly relied upon; in fact, unless the tubercle bacilli can be demonstrated in the tissues or by inoculation, we should consider the condition syphilitic; and also that the ordinary doses of mercury and potassium iodide will show small results in these connective tissue conditions. It requires mercury and potassium to the limit administered over a considerable period of time to show satisfactory results.

15 East 48th St.

ANATOMICAL AND SURGICAL CONSIDERATIONS OF THE SINUS FRONTALIS.

BY H. J. H. HOEVE, M. D., DES MOINES, IOWA.

In studying the frontal sinuses in the different textbooks of anatomy we cannot fail to get the impression that normally these intramural sinuses consist of two cavities, which are located between the two layers of the frontal bone, just above the root of the nose and the mesial third of the supraorbital ridge. This is due to the superficial treatment that a general textbook gives this subject, even though of enormous surgical importance. The development of the frontal sinuses is peculiar in more than one point. They are formed, like the sinus sphenoidalis, much later than the maxillary sinuses, and the ethmoidal cells, which are completed before birth. According to Cunningham, traces of the frontal sinuses may be found in a great many cases about the second year, although they can not be distinctly recognized before the age of seven. According to Treves, the sinuses are not marked before the age of ten, while Combe states that they do not exist before the age of twelve. So, in summing up the statements of these various authorities, we can readily see that we do not have to pay much attention to them before the twelfth year.

The first developmental difference from the other sinuses is that the frontal has to develop after birth, whereas the others, except the sphenoid, were present, although incomplete at birth. The second point is, that this sinus, like the sphenoid, is formed by an invagination from the nasal cavity, and a subsequent absorption of the cancellous bone tissue, the diploe. In case of the ethmoidal cells, we find that each of the lateral masses of the os ethmoidalis has one osteogenetic center, which appears about the fourth or fifth month in the region of the os planum, and that from these centers are formed the laminae around the air cells which are complete at birth. These laminae are entirely ossified about the fourth or fifth year. (Cunningham.) So here the absorption of diploe does not take place.

Nearly all authors agree that the sinuses increase in size till puberty or up to about twenty years, at which period they reach their full development. (Treves, Combe.) According to the same

men, large sinuses are mostly found after the twentieth year, and it certainly cannot be doubted, but that there is an enormous increase in the size of the frontal sinuses about this time. But that does not complete the growth of the sinus, for we find that after a period of fifteen or twenty years of rest, the sinus commences again to increase in size, but this time it is not due to the primary unknown cause of its formation, or to the different changes which puberty brings along with it, but to the internal plate of the frontal bone, (as in case of all the bones entering into the formation of the cranial cavity), following the cortex of the brain, which is moving away from it. For the brain begins to slightly decrease in size at this period, which falls between 38 and 42 years, on account of the senile changes (senile atrophy), while the external table of the skull retains its shape. So we might conclude from this that we may expect to find the largest and best developed sinuses in men who are passed 40, and especially in the aged.

In observing, inspecting and dissecting the heads of some of the lower animals, especially with reference to the frontal sinuses, I found a great many points which are of interest. The first peculiarity I noticed was in the skull of a female hound. It consisted of a middle set of frontal sinuses, which were located just above the root of the nose, let us say, above and behind the nasal spines of the frontal bones. They were distinctly separated by sagittal septae from the lateral set, which is ordinarily present. To make it plain, it seemed as if this middle set of cells was developed within the median septum, which in most cases is found to separate the frontal sinuses. The posterior part of the sinuses was divided by a coronal septum.

These sagittal and coronal septae are also frequently present in human skulls.

THE THREE SAGITTAL SEPTAE OF THE SINUS FRONTALIS IN MAN.

It is possible to recognize at least three septae, an external, a middle and an internal, extending in a sagittal direction, which, when present, are fairly constant in shape, position and extent, especially in the vital type of the lower animals and man. They have individual characteristics by which they can be identified; but all three have the following points in common: 1. They have the appearance of being formed by an invagination of the thin, bony wall of the sinus. 2. They extend downward and backward parallel to the sagittal median plane of the head. (The external one extends mostly a little outward or inward in addition to backward.)

The Internal Sagittal Septum.—This septum seems to be complete in 98% of all cases and corresponds to the internal wall of the sinus proper in the mental and motor types.

In the cases where an internal accessory sinus is present (mostly vital types) it seems as if the internal wall was moved outward to the place where we usually find the middle sagittal septum and that a new internal sagittal septum is formed, which in these cases corresponds to the internal wall of the internal accessory sinus. A fact which speaks in favor of this is, that it is mostly the space between the middle and external sagittal septae, which is drained directly by the infundibula.



Fig. 1. Skull of Motor Temperament, (Male.) No Frontal Sinuses.

In some of the lower animals we find the space between the two sinuses filled with diploe, and there we can see readily that this space corresponds to the location of the internal accessory frontal sinus of the human. The two internal sagittal septae can be looked upon clinically as being located in the median sagittal plane of the skull. They are united with each other for their middle three-fifths in such a manner as to form the middle septum between the right and left bony sacs. The upper one-fifths are separated from each other, but the space between them is filled in by diploic cells. They can be chiseled away carefully, so as to show an antero-posterior

groove between the upper parts of the left and right sinuses. For the lower one-fifth of the extent of these septae, we find that they are separated by the upper part of the perpendicular plate of the ethmoid bone, which is attached to both of them in such a manner as to compel them to assist in the formation of the internal parts of the upper boundary of the infundibula. The septae are triangular in shape and can be said to have a base, which is closely attached to the upper part of the perpendicular plate of the ethmoid, an anterior border which is continued forward and outward into the anterior wall, and a posterior border which is continued backward and outward into the posterior in two cases out of 100.

The Middle Sagittal Septum.—This septum is quite frequently present in some of the lower animals, where it can be seen to separate an internal accessory sinus from the sinus proper.

In human beings it is in most cases located about midway between the internal sagittal septum and the supraorbital notch, frequently a little more internal. Occasionally this septum is very close to the internal sagittal septum, and then a very small internal accessory sinus is present. If this septum is absent, then a ridge mostly takes its place, which is generally well marked near the anterior and occasionally on the posterior wall. This septum presents the true internal wall of the sinus proper, and I found it complete in one case, where it was located internal to the upper opening of the infundibulum.

The External Sagittal Septum.—This septum is very frequent in vital types and is mostly located at or external to the supraorbital notch. As far as my observations go, it cannot be called a complete septum, because I have never seen it touch the floor of the sinus, in fact its inferior border always seems to be free and frequently concave from before backward. As said before, it is formed by an invagination from the the anterior wall, and consequently it is much thicker at this point. In some cases it is possible to chisel out a little groove on the anterior surface of the bony sac of the sinus (by removing the diploe carefully), which corresponds to the place where the anterior surface became invaginated, in order to form this external septum. This septum is frequently triangular in form, and has frequently a very sharp apex. This septum, when present, forms the external wall of the sinus proper and the internal wall of the external accessory frontal sinus.

THE CORONAL SEPTUM OR THE TRUE POSTERIOR WALL OF THE FRONTALIS PROPRIUS.

If the coronal septum is present, than a posterior supplementary part of the sinus can mostly be made out behind it, and it must be remembered that this septum should be looked upon as the true posterior wall of the sinus proper and going a little farther, I may say that it is to the interest of every surgeon who has to deal with



Fig. 2. A Female Skull. (Vital Temperament.) Showing all the peculiarities described in this paper, except the Superior Accessory Frontal Sinus.

a Right Internal Sagittal Septum. (Perforated.) *b* Right Median Sagittal Septum. (Complete in this Case without Perforations.) *c* Right External Sagittal Septum. (Incomplete.) *d* The Right Coronal Septum. *e* The Inferior or Free Margin of the Right Coronal Septum. *f* The Right True Frontal Sinus. *g* The Enormously Enlarged Right Internal Accessory Frontal Sinus, which does not drain into the Right Infundibulum and which is entirely closed off from the Right True Sinus by the complete Right Median Sagittal Septum. *h* The Right External Accessory Frontal Sinus. *i* The Anterior Opening of the Right Posterior Accessory Frontal Sinus. *j* Location of the Upper Opening of the Right Infundibulum. *k* The Left Bulla Frontalis. *l* Location of the Upper Opening of the Left Infundibulum. *m* The Left True Frontal Sinus.

frontal sinuses, to inspect this posterior wall in cadavers of the lower animals as well as in men, in order to be able to appreciate its form and peculiarities, as far as the presence or absence of the posterior supplementary sinus is concerned.

In a great many cases in which the coronal septum is present (see table) we see at once the peculiar makeup of the posterior wall, which extends downward parallel to a coronal plane of the head. We see a curved line extending upward and outward from the postero-internal angle of the sinus which is located a little behind the middle of the internal margin of the upper opening of the infundibulum. The convexity of this curved line corresponds to the concave or free margin of the posterior wall of the sinus. The concavity of this curved line is either filled in by a thin lamina of bone, extending in the same direction as the posterior wall just mentioned, or it presents a free semilunar margin which seems to form the upper boundary of a communication between the sinus proper and the posterior accessory frontal sinus. The relation of this opening to the upper opening of the infundibulum is peculiar. The opening of the infundibulum points downward and backward, whereas this one could give passage to anything which passes just above the upper opening of the infundibulum in an antero-posterior direction.

The similarity between the posterior wall of the sinus in dogs and this peculiar coronal septum in men is very striking, it has the same shape, the same appearance and, in some cases, the same extent. In some cases, it is rudimentary, as in some of the lower animals. If we find an opening just below the free margin of the posterior wall of the sinus in men, then it can be seen by anybody that there is a cavity behind the large septum, but if this concave margin is filled in by bone, then the question arises, is there an accessory cavity, or is the cranial cavity behind the septum? This is, of course, a very important question to the surgeon. The upper opening should be inspected closely in these cases. If the thin bony lamina, which extends downward from the inferior or free margin of the coronal septum, should slant downward and backward, so as to become attached to the posterior margin of the upper opening of the infundibulum, that is, if we are unable to find the lower margin of this thin, bony lamina to be free at this place, then the utmost caution is necessary, as far as perforating the posterior wall of the sinus is concerned, because you may open up the cranial cavity. In some cases I found this lamina to be perforated by small openings, and whenever they can be made out distinctly, then you can expect an accessory cavity behind the septum. There is another variety, in which this portion of the posterior wall forms a little bony pouch with its concavity forward, in other words, the thin bony lamina

seems to be pushed backward and a little upward in such a way as to form a distinct roof above the posterior part of the upper opening of the infundibulum. This, of course, gives the inferior margin of the coronal septum the appearance of the inferior or free margin of this septum, which we found in some of the other specimens, and so you can readily see that it is absolutely necessary to pass a probe, though carefully, through the communicating opening before this posterior wall is attacked. If the little pocket I just spoke of is found to be present, then in some cases on careful examination with a small probe, we may be able to find some small openings on its external wall, which extend into the posterior accessory frontal sinus, if not, then either the anterior ethmoidal cells or the cranial cavity are behind it. According to the accompanying table you will find that it is safe to chisel through the thin bony lamina in 85% of all the vital types, in 19% of all the motor types and in 10% of all the mental types. In some cases a bulging can be noticed just above the upper opening of the infundibulum, which corresponds to one of the anterior ethmoidal cells and is mostly called the frontal bulla.

Now then, it is true that whenever this coronal septum is absent, its position is always indicated by a transverse ridge. Whenever this coronal septum is present it is always located exactly where we should expect to find the posterior wall of the sinus proper. In fact, when complete, nothing is seen in this locality except this septum, and it is also true that whenever this septum is nearly complete, there always is a cavity behind it. Whenever the cavity behind the coronal septum is present, this cavity is found (especially in man), to extend backward over the orbit, or better say over the inferior lamella of the horizontal portion of the os frontalis. In short, if you are able to make out a distinct transverse slightly curved ridge in the postero-superior part of the sinus proper, then the posterior wall can not be formed by the coronal septum, on account of its absence and consequently the posterior accessory sinus is either absent or open, even if the lower part of the posterior wall has the appearance of the lower part of the coronal septum. If, on the contrary, the coronal septum is present, then the transverse ridge in the postero-superior part of the sinus proper is absent; and if the lower part of the posterior wall has the peculiar markings of the coronal septum, then in these cases we can reasonably suspect the presence of the posterior accessory frontal sinuses. Up to now I have spoken mainly of the vital type, on account of having found the

most extensive posterior accessory frontal sinuses and sagittal and coronal septae in this type, but, of course, as you can see from the accompanying tables, they are also found in the other types. In fact, the motor type seems to have them more frequently than the mental type. I would like to state that I have never seen a case where the posterior accessory sinus extended as far back as the optic foramen (Sir Logan Turner's paper), but I have seen quite a few cases where the bony sac of the posterior accessory sinus was entirely blended with the superior and inferior lamella of the horizontal portion of the frontal bone, but even in these cases it is possible to find the most posterior part of the bony sac, which very frequently corresponds to a very thin lamina of bone, separating the posterior accessory sinus from the anterior or sometimes the middle ethmoidal cells. On close inspection of a sagittal section of one of these cases it is only too plain that the upper and lower extremities of this bony septum just mentioned are bent forward on account of corresponding to the most posterior part of the bony sac of the posterior accessory sinus. In one case I found it perforated, so that there was a distinct communication between the posterior accessory sinus and the anterior ethmoidal cells. The ethmoidal cells were very large in this case, at the same time I could not look upon them as belonging to the posterior accessory frontal sinus, because they did not enter into the formation of the bony sac of this sinus. In the most posterior part of the bony sac of the posterior accessory sinus, there is frequently a transverse ridge, which is formed by the bony canal for the anterior ethmoidal vessels and the nasal nerve.

BOUNDARIES OF THE POSTERIOR ACCESSORY FRONTAL SINUS.

Anterior.—The posterior surface of the coronal septum.

Superior.—That part of the bony sac of the posterior accessory sinus, which is in relation to and mostly blended with the superior lamina of the horizontal part of the frontal bone.

Posterior.—That part of the bony sac of the posterior accessory sinus which is in relation to the anterior or middle ethmoidal cells, or the superior lamella of the horizontal part of the frontal bone, (in case the superior and inferior lamella of the horizontal part of the os frontalis blend just behind this part of the sinus.)

Inferior.—That part of the bony sac of the posterior accessory frontal sinus which is in relation to, but mostly blended with the inferior lamella of the horizontal part of the os frontalis and near

the median line with the upper parts of the anterior and middle ethmoidal cells.

Internal.—That part of the bony sac of the posterior accessory sinus which is in relation to the superior lamella of the horizontal plate of the os frontalis, where it forms the lateral boundary of the fossa which lodges the olfactory bulb.

External.—That part of the bony sac of the posterior accessory sinus which is in relation to or blended with the line formed at the external part of the sinus by the junction of the superior and inferior lamellae of the horizontal portion of the os frontalis.

BOUNDARIES OF THE SINUS FRONTALIS PROPRIUS.

By the term, "True frontal sinus," I understand a frontal sinus, as it is frequently found in the lower animals and in the mental type of man; bilateral, pear-shaped and not divided by septae, not extending backward more than one-half inch or even less, not farther outward than the supraorbital notch, and being separated from its fellow on the opposite side by its internal wall and diploe.

When the septae are present, then the cavity between the middle and external sagittal septae, being inferior to the coronal septum, may be looked upon as the true frontal sinus, on account of the occasional presence of the internal and the frequent presence of the posterior accessory frontal sinus.

Occasionally we find one large sinus on each side of the median line, which extends outward as far as the junction of the middle with the outer one-third of supraorbital ridge, but upon close examination, we are mostly able to find rudimentary middle and external sagittal septae, and also a rudimentary coronal septum, indicating the extent of the sinus proper.

In 60% of all vital types we find beginnings of sagittal septae (external to the lateral sagittal septum) extending backward and possibly a little outward from the anterior wall, so that if pus should be present in the sinus, they would form small shelves or, as in some cases, small pockets from which the pus does not have any way of escape, except by flowing around the posterior or inferior free margin of these sagittal septae. This is mostly possible, on account of the floor slanting toward the upper opening of the infundibulum, but it happens in some cases that the floor is not slanting, and the result is that the pus can not leave these places.

THE EXTERNAL ACCESSORY SINUS OR SURGICAL POCKET OF THE SINUS FRONTALIS.

This pocket corresponds to the most external and anterior part of the sinus frontalis and being frequently pyramidal in form, can be said to have a base, an apex, an anterior, a posterior and an internal wall. The presence of this pocket depends entirely upon the presence of one or both of the following factors: 1. Upon the floor in that region being depressed in such a way as to prevent drainage. 2. Upon the presence of a sagittal septum in the region of the supraorbital notch. When this septum is present then we should have three sagittal septae, an internal, a middle and an external sagittal septum.

The Base.—It is the lowest part of the pocket and corresponds to that portion of the floor, which is external to the external sagittal septum. Its external part is mostly higher than its internal, but frequently it is the reverse, especially if a large and distinct supra-orbital canal is present. The most external part of the base, which corresponds to the junction of the anterior and posterior walls of this small surgical space is mostly turned up a little, so as to present a round corner.

The Apex.—Corresponds to the junction of the anterior, posterior and internal walls, and is located external to, but at the upper part of the inner wall. It is placed at this point on account of the internal wall when present, being the only vertical one of the pyramid.

The Anterior Wall.—Is formed by the posterior surface of the anterior part of the bony sac of the sinus. Anterior to that we generally find a little diploe, which separates it from the external plate of the vertical portion of the os frontalis. In some cases the diploe is absent and then the sac is blended with this part of the frontal bone. Frequently small additional external sagittal septae extend backward from the posterior surface of the anterior wall. In some cases, the external frontal diploic vein is found to wind its course through the diploe just anterior to the most external part of the anterior wall of the pocket.

The Posterior Wall.—If not incomplete (as far as the pyramidal shape is concerned), is mostly formed by the postero-external part of the bony sac of the sinus. Its most external part is always concave from side to side and frequently also from above downward. This is probably due to it being the most external part of the sinus.

The angle which is formed at this point between the anterior and posterior surface is not definite, in fact it is rounded off. In some cases the coronal septum, which I shall mention in detail afterward, forms a part of this posterior wall. This wall, as well as the anterior one, is not vertical, but slightly sloping toward the apex.

The Internal Wall.—As said before, the internal wall corresponds to the external sagittal septum, probably the most marked one of a few external sagittal septae which is mostly located just above the supraorbital notch. It is frequently absent (see tables), and then, of course, the surgical importance of the space would depend upon the character of the floor, but when present it can be said to have nearly the same make up as the middle sagittal septum. I have never seen it complete, and it frequently seems to be poorly developed. Its anterior margin is, of course, firmly attached to the posterior surface of the anterior wall of the sinus, but in some cases nothing else but a bony ridge, which is well marked on the posterior as well as on the anterior wall, indicates the location of the internal wall of this pocket.

In a horizontal section, we can see plainly that this external sagittal septum consists of, and is formed by a folding in of the anterior wall of the bony sac of the sinus. Whenever present, its posterior or postero-inferior border is always concave and its anterior extremity reaches a little farther downward than the posterior. These septae and, of course, also the spaces, seem to be more frequent in the vital than in the mental or motor types.

BOUNDARIES OF THE INTERNAL ACCESSORY FRONTAL SINUS.

In some of the lower animals the right and left frontal sinuses are naturally widely separated, and the septum between the two consists of the thin but dense internal part of the bony sacs of the sinuses with diploe and the interfrontal suture interposed. In such a case in the human we should have a pair of true frontal sinuses; but, in some of these cases, the diploe of this thick septum between the two becomes hollow, leaving the internal wall of the true sinus in place, but forming a new sinus internal to it and we would have an internal supplementary or accessory frontal sinus. Frequently the internal wall of the sinus proper, or the middle sagittal septum, which is the same, is not present and then it seems as if the true sinus extended up to the interfrontal suture, but the findings in the lower animals reveal the truth. The boundaries of the internal supplementary sinus, even if not always present, would be:

Anterior.—The anterior wall of the bony sac of the sinus.

Internal.—The internal sagittal septum.

Posterior.—The coronal septum or the posterior wall of the bony sac

External.—The middle sagittal septum.

The internal accessory sinus is frequently met with in vital types of man, sometimes it is very small and incomplete and located internal to the upper opening of the infundibulum, but always anterior to the coronal septum whenever this is present. Two small pockets, one in the base of the crista galli and one in the frontal spine, when present, frequently open into it.

I did not find frontal sinuses in the skulls of swallows, wild ducks, wild geese, the heron, the mink or the muskrat. In the skull of a large species of owl I found that the cells were pretty well developed and of a peculiar makeup; in the dog they were also well developed, while in the stag they were not very large, and in the hog, the ox and the buffalo, I found them to be much larger. So the sinuses are absent in certain of the animals. If we reflect for a moment what the inherited qualities are of these animals, which I have examined, that is, so far as their temperaments are concerned, then we are struck at once by the fact that those animals which naturally exhibit steady and rapid motions, and whose general makeup leads us to classify them as motor, are the ones which do not have any, or at least have the smallest sinuses, and that in the ones which are much slower in exercising their muscular strength and whose general makeup leads us to classify them as mental or vital temperaments the sinuses are much larger.

As said before, the swallow, the wild duck, the wild goose and the muskrat have no cells, the owl, which certainly can be called lazy, has pretty fair-sized cells, which are supposed to be much greater than the ones of the active eagle; while the fox (motive-mental temperament) and the hog (vital temperament), have much larger calls than the stag. Now, if these observations as to the respective sizes of sinuses in the different types of animals are correct, we can expect the same observations to be true in the sinuses of the different human types, and upon examining some of the human skulls in my collection, which I classified as belonging to motor types, to my own satisfaction I found that the same thing holds true for human beings.

Frontal sinuses are largest in the vital temperament of man.

Frontal sinuses are of fair size and mostly symmetrical in the mental temperament of man.

It is a difficult matter to state what would constitute a normal frontal sinus in man, because the variations in size, shape and extent seem to differ in different individuals, and even in the same individual a difference between the right and left sinus can be appreciated; but that does not take away the fact that the development of the sinus is in close relation to the general proportional makeup of man.

PECULIARITIES FOUND IN THE LOWER ANIMALS.

1. Absence of frontal sinuses in some of the lower animals.
2. The median septum is formed by the internal walls of the left and right frontal sinuses (in all animals).
3. The presence of a median sagittal septum in all animals.
4. The presence of a lateral sagittal septum in some. (See table.)
5. The presence of an internal accessory frontal sinus. (See table.)
6. The presence of a coronal septum in some. (See table.)
7. The presence of a rudimentary posterior accessory frontal sinus in some. (See table.)
8. The presence of large diploic cells above the sinuses, between the two tables of the frontal bone. (Cow and buffalo.)
9. The frontal sinuses communicating distinctly with the diploic spaces between the two layers of the calvarium. (In the cow and buffalo.)
10. The supraorbital canal forming a distinct ridge in the outer part of the anterior wall of the sinus. (In all hog skulls.)
11. The presence of a rudimentary external sagittal septum. (In some dogs.)

FINDINGS IN FIFTY CAT SKULLS AND FIFTY DOG SKULLS.

	Cat Skulls.	Dog Skulls.
Only a left frontal sinus.....	5	0
Only a right frontal sinus.....	5	0
No frontal sinuses.....	0	0
A median sagittal septum.....	50	50
A left lateral sagittal septum.....	17	24
A right lateral sagittal septum.....	21	24
A left and a right lateral sagittal septum.....	17	24
A left median cell or internal accessory frontal sinus.	17	24

	Cat Skulls.	Dog Skulls.
A right median cell or internal accessory frontal sinus.	21	24
A right and left internal accessory frontal sinus.....	17	24
A well developed left coronal septum.....	21	24
A well developed right coronal septum.....	16	24
A well developed left and right coronal septum.....	16	24
A rudimentary left coronal septum.....	32	21
A rudimentary right coronal septum.....	33	18
Rudimentary left and right coronal septae.....	32	18
Well developed posterior accessory frontal sinuses...	16	24
Rudimentary posterior accessory frontal sinuses.....	33	18
A ridge in one or both of the sinuses, caused by the supraorbital canal	0	0
A rudimentary external sagittal septum.....	0	21

The frontal sinuses seem to be more frequently smaller or absent in the male than in the female animals. (Motor and mental temperaments).

SUMMARY OF THE MAIN FINDINGS IN ONE HUNDRED HUMAN CADAVERS.

1. The pear-shaped sinus, having no septae and no accessory sinuses, which is frequently present in some of the lower animals and sometimes in mental types of human beings, represents the sinus frontalis proprius of men.

2. The sinus proprius frequently communicates with supplementary or accessory sinuses and then its walls would, of course, be transformed into septae.

3. All the septae are frequently rudimentary in human skulls.

4. All the accessory frontal sinuses, whose distinctness depends upon the clear demarcation of the septae are consequently rarely well marked in one skull. (See Fig. 2, where everything but the superior accessory sinus is present.)

5. I recognize a coronal septum, which is mostly incomplete at its lower end, which in the frontal sinus of some of the lower animals extends downward and a little forward from the anterior surface of the posterior part of the bony sac of the sinus and which corresponds to the transverse or coronal septum in men. I take this septum to represent the true posterior wall of the frontal sinus proper in men as well as animals. This septum is either represented by a semilunar ridge, extending in a transverse direction in the postero-superior part of the sinus, or a short or long transverse septum, which is incomplete in its most inferior part, which corresponds to the posterior wall of the sinus proper, and which has

characteristics, indicative of the presence or absence of the posterior accessory frontal sinus.

6. I recognize three sagittal septae, as being fairly constant, especially in the vital type, an internal (the one in the median line between the two frontal sinuses), a middle (lateral or median sagittal septum), and an external (external sagittal septum), the latter being the least constant of the three.

7. Frequently an internal set of accessory frontal sinuses is present, on account of the middle sagittal septae being complete, especially in vital types.

8. Occasionally a superior accessory sinus is present, mostly in thick skulls.

9. Frequently a posterior accessory sinus is present, especially in vital and mental motive types.

10. Frequently an external accessory sinus is present, presenting mostly a definitely outlined space or pocket at the external part of the sinus proper, which is important on account of pus retention.

THE EXAMINATION OF 100 HUMAN CADAVERS REVEALED THE FOLLOWING POINTS IN CONNECTION WITH THE FRONTAL SINUSES.

Unclassified.	Mental types.	Motor types.	Vital types.	
100	16	64	20	
58	4	51	3	Had diploe between the anterior part of the bony sac of the sinus and the anterior part of the vertical plate of the frontal bone.
0	0	0	0	Had only a left frontal sinus.
0	0	0	0	Had only a right frontal sinus.
20	0	20	0	Had no frontal sinuses. (Every one of the 20 had a dilated upper part of the infundibulum.)
80	16	44	20	Had internal sagittal septae. (See 20% which had no sinuses.)
2	0	2	0	Had perforated internal sagittal septae.
23	2	8	13	Had a left median sagittal septum. (Well developed or rudimentary.)
23	2	8	13	Had a right median sagittal septum.
23	2	8	13	Had a left median cell or internal accessory frontal sinus.
23	2	8	13	Had a right median cell or internal accessory frontal sinus.
23	2	8	13	Had a right and left internal accessory frontal sinus.
32	2	13	17	Had a well developed left coronal septum.
32	2	13	17	Had a well developed right coronal septum.
32	2	13	17	Had well developed left and right coronal septae.
32	11	19	2	Had a rudimentary left coronal septum.
32	12	18	2	Had a rudimentary right coronal septum.

Unclassi- fied.	Mental types.	Motor types.	Vital types.	
31	11	18	2	Had rudimentary left and right coronal septae.
32	2	13	17	Had a well developed left posterior accessory frontal sinus.
32	2	13	17	Had a well developed right posterior accessory frontal sinus.
32	2	13	17	Had well developed left and right posterior accessory frontal sinuses.
32	11	19	2	Had a left rudimentary posterior accessory frontal sinus.
32	12	18	2	Had a right rudimentary posterior accessory frontal sinus.
31	11	18	2	Had a left and right rudimentary posterior accessory frontal sinus.
1	0	1	0	Had a plainly marked superior accessory frontal sinus.
1	0	0	1	Had a ridge, in one or both of the sinuses, caused by the supraorbital canal.
22	3	7	12	Had a well developed external sagittal septum.
14	2	4	8	Had a rudimentary external sagittal septum.
30	2	10	18	Had an external accessory frontal sinus.

METHOD OF OPENING THE FRONTAL SINUS.

(As far as the anatomical facts are concerned.)

This depends greatly upon the diagnosis arrived at, as far as the temperament of the subject is concerned and the probable extent of the sinuses, but the following points are of value for routine work in most cases.

1. As to the presence or absence, as to the size and extent of the sinuses, no matter what the external findings may be, it is possible to be mistaken in a small per cent of the cases.

2. Never use a trephine, but only a small chisel and a mallet. In a great many cases, especially vital types, it is possible to open the sinus nicely, simply by the use of the chisel, much as the dentist enlarges the cavity of a tooth with a small chisel, without the use of anything else. This certainly does away with the profound jarring, which can not be avoided by other methods.

3. Begin your chiseling in every case at the antero-internal part of the inferior surface of the sinus. This would be a little anterior to the point to which Sir Logan Turner applies the electric bulb for transillumination. The point I have in mind is located one-half inch horizontally outward from the nasion anterior and above the internal angle of the frontal bone, and is at an equal distance from the nasion ($\frac{1}{2}$ inch— $12\frac{1}{2}$ mm.) and from the internal canthus of the rima palpebra. ($\frac{1}{2}$ inch— $12\frac{1}{2}$ mm.)

Do not go too high up or too far back, for fear of injuring the trochlea of the muscularis obliquus superior, which, according to H. P. Mosher, M. D., (see *Boston Medical and Surgical Journal*, September 7, 1905), is located $\frac{3}{4}$ of an inch (18mm.) from the median line; $\frac{1}{4}$ inch (6mm.) nearer the median line than the supra-orbital notch or foramen, and $\frac{1}{4}$ inch (6mm.) below it.

4. Cutting through the external dense layer of bone, you will either strike diploe (motor type) or go right into the sinus. (Vital type.) If you should strike diploe watch carefully and see if the diploic cells are getting smaller at a depth of three mm. If the cells are getting smaller, then you come to a dense lamina before or at this depth, which corresponds to the anterior part of the bony sac of the true sinus. You simply found diploe between the anterior lamella of the vertical plate of the frontal bone and the anterior part of the bony sac of the true sinus. If the diploic cells do not get smaller at a depth of 3mm., then direct the chisel downward, inward and backward, in order to strike the middle set of cells if present, because continuing to chisel backward would lead to the cranial cavity, the diploic cells would be getting smaller at a depth of probably 5mm. in these skulls, at the same time the dense lamina you would come to, would correspond to the tabula vitra.

5. Cut away enough, so as to be able to inspect the entire posterior and inner walls of the sinus proper.

6. Study the posterior wall for indications of the presence of the posterior accessory sinus.

7. See if the internal wall corresponds to the location of the interfrontal suture or median sagittal plane, if not, expect the presence of an internal set of sinuses.

8. Probe the roof carefully, in order not to miss the superior accessory sinus if present.

9. Inspect the most external part of the sinus proper for the external accessory sinus or surgical pocket mentioned in this paper.

I have read with interest Dr. Cryer's article on frontal sinuses in the *American Medical Journal* of January 26, 1907, and I would like to point out, that a great many points in this paper can be verified by the text and cuts of his paper, even though the article came too late to be of special use to me.

1505 W. 9th St.

CEREBELLAR ABSCESS FOLLOWING ACUTE SUPPURATION OF MIDDLE EAR. OPERATION. DEATH. AUTOPSY.*

BY W. D. BLACK, M. D., ST. LOUIS,

While the subject of cerebellar abscess is not new, I believe that the reporting of cases to a general society often brings out many new points in the discussion. Cases which result favorably often give the author or operator more satisfaction, but less real knowledge, than those which terminate fatally, where an autopsy is allowed. This case that I will report has many points of special interest, and I earnestly hope the discussion will be general, so that all of us may gain additional knowledge of a still imperfectly understood subject.

History.—Oct. 18th, 1905, I was called by the attending physician to examine patient, who was a boy 14 years old, white, of medium build, with a history of having had no constitutional disease with the exception of neuralgia and severe cold in the head, which had caused acute suppuration in his right ear, and which had existed for two weeks, followed by recovery. This was about one year prior to the present illness. The present attack had existed about four weeks before I saw him. The attending physician called me because of the boy having a headache on the right side. The pain was very severe, being first noticed above the ear and radiating to the frontal region. The physician informed me that the patient had from one to two degrees of fever at first, but when the ear began discharging the temperature fell to normal. When I first saw him, the patient had been vomiting for several days and complained of vertigo on moving. The pulse ranged from 60 to 70, full, strong and slightly irregular, missing a beat occasionally. Pain in the head was almost constant and more noticeable in the frontal region. Bowels regular, but a tendency to constipation. Patient drowsy and sleeping most of the time. Later the attendants found it more difficult to arouse him than when he was first taken ill. No delirium.

Examination.—No tenderness or swelling over the mastoid region. Walls of the external auditory canal swollen, making it impossible to see the tympanic membrane, at the entrance of canal, a

* Read before the Eleventh Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology, St. Clair, Mich., August 30, 31 and September 1, 1906.

furuncle developed, partially blocking the lumen of the canal. The auricle itself normal. Discharge from canal small in amount and very offensive. Patient was very ill and I omitted the customary tests for hearing. Loud conversation could be heard, but not very well. The attending physician and myself strongly suspected intracranial complication, but decided to wait a day or two and treat patient on the expectant plan. I ordered an ice-bag to the head and hot carbolized douches with fountain syringe for ear, to be used every three hours. At the expiration of twenty-four hours the patient seemed better; swelling of the canal wall much less. Pain about the same. Discharge from the ear a little more profuse. General condition worse. I decided to perforate the tympanic membrane and an anesthetic was given. I made a crucial incision in the membrane, sacrificed canal walls, opened the furuncle, packed lightly and applied heat externally. Next day the discharge was greater in amount with little odor, and the canal walls almost normal. General condition worse, although vomiting ceased for a time. Examination of the viscera showed that they were normal. Urine decreased in amount, showing a trace of albumin and a few granular casts. Intestines more difficult to move, with a tendency to impaction. Examination of the eyes showed no strabismus, pupils reacted normally, no fundus changes. No rigidity of muscles of neck and no retraction of head. Slow cerebration. This latter symptom was very marked. We were now almost positive we had an abscess to deal with and advised operation. Parents agreed, and the patient was taken to the hospital. This was five days after first seeing the case.

Oct. 22nd, 1905. Patient was prepared in usual manner, and a Swartze-Stacke operation performed. Entering the antrum was quite difficult, owing to the compact bone, although it was not sclerosed. Antrum contained three or four drops of pus. The walls of the antrum were apparently healthy. I now worked backward, enlarging the opening, and exposed the sigmoid sinus for two-thirds of an inch. Found sinus of good color, compressible, and from the healthy bone around it concluded that opening it was unnecessary. General symptoms did not appear like those you expect to find in sinus thrombosis. The next step in the operation was making an opening one and one-fourth inches in diameter, one and one-fourth inches behind and one and one-fourth above the external auditory meatus. Dura of good color and brain pulsated normally. Incised dura almost the entire width

of opening and inserted trocar and cannula in every direction to a depth of from one to two and a half inches, especially along the tegmen tympani, but found no pus. Inserted a small piece of selva edge gauze within the cerebrum for about two inches. Upon the urgent solicitation of the attending physician, the dura was left open. I carefully packed the brain wound from the mastoid opening and then brought the edges together and stitched, leaving the lower one-fourth inch open for drainage. The patient's condition at this time was not good, and it was decided to delay opening the cerebellum for a day or two. The patient was put to bed and stimulants given. Time of operation was two hours, the delay being caused by having to work with coal oil lamp. The temperature the next three or four days ranged from 98 to 98.4°. No vomiting. Pulse regular, 76 to 78. Respirations, 18 to 20. Removed the wick from the cerebrum and dressed the mastoid wound on the second day. Wound looked healthy. Brain substance protruding slightly through opening in skull. No pus in either wound.

October 25th. -(Three days after operation.) Pulse 74, good, no irregularity; respiration, 18; no vomiting, no headache; tongue clean; facial expression good; patient answers questions readily, and hears low conversation. For the next seven days improvement was marked and all organs functionated normally. Patient stated he felt well enough to go home. Wound dressed every other day. Brain prolapse grew larger regardless of firm pressure with bandage. This prolapse grew to the size of a walnut and then became stationary. About the thirteenth day after operation the patient became restless and all the symptoms which existed prior to operation returned. Wound looked healthy, but prolapsed brain tissue began to soften and break down. Owing to the patient's improvement we began to doubt our original diagnosis, and thought we might be dealing with a case of serous meningitis, but with the return of the symptoms we determined to relieve the brain prolapse first and then explore the cerebellum.

Operation for Brain Prolapse. Nov. 6th. (Fifteen days after first operation.) Split scalp for one-half inch above upper edge of wound and extended towards the bregma. We next broke the adhesions which existed between the brain tissue and that of the scalp, which, by holding the brain prolapse from protruding still farther, caused the return of symptoms by not allowing the relief of increased intracranial pressure. Tied off the brain prolapse as

close to its base as possible and cut with scissors. Cut a small artery which was difficult to ligate, but the hemorrhage was controlled by suturing the periosteum, cutting out the piece, and then cauterizing with actual cautery. I now cut a piece of silver screen slightly larger than the opening and placed it in position, using as little force as possible. I next made a flap of periosteum and cellular tissue on each side and sewed them together, leaving a small opening at the lower angle of the wound, then brought the muscular tissue over this and stitched. Time, one hour and five minutes. While I was preparing to make the opening for the exploration of the cerebellum, the patient gave a peculiar gasp, a kind of long-drawn sigh, when respiration suddenly ceased. It seemed like a sudden paralysis of the diaphragm. Artificial respiration performed. Pulse fast and weak. Hypodermoclysis given, heart stimulants used, and patient put to bed. Artificial respiration was used continuously, although breathing had ceased entirely, and this procedure was kept up for six hours, when cardiac action ceased.

Post-Mortem Findings.—Cerebrum. Dura everywhere injected, but few adhesions were found. Sections made in all directions and medulla and pons cut in small transverse sections. At the site of the opening in the skull the brain tissue was softened; otherwise the cerebral tissue looked normal. The lateral ventricles were apparently larger than normal and contained considerable serum.

Cerebellum. On making an incision in the right lobe of the cerebellum, an abscess about the size of a hickory nut was discovered, containing about one-half ounce of thick greenish and yellowish pus, and situated about the center of the right lateral lobe. It seemed to have no connection with the lateral sinus.

In conclusion, there are a few points of interest I would call your attention to:

1. Mode of infection.—I believe the infection occurred through the lymphatics, as the sigmoid sinus and the osseous walls around it were healthy.

2. Doubt of correctness of original diagnosis after first few days following operation.—All previous symptoms disappeared and only returned when brain prolapse became adherent to surrounding tissue.

3. Rarity of cerebellar abscess in acute suppurations of middle ear in children.—This is very uncommon, and when it does occur is usually from direct extension of infection backward.

4. Kind of infection.—Bacteriologist made no report.

5. Cause of death.—Compression of brain due to the closing of the opening, thereby increasing the already great intracranial tension, causing paralysis of the center of respiration.

6. Silver fillet in brain surgery.—The use of this is, in my opinion, not advisable, owing to the difficulty of placing it in position and also owing to its wide meshes allowing the brain tissue to protrude.

1411 California Avenue.

Clinical Reports. SIGISMUND SZENES. *Arch. f. Ohrenh.*, Leipzig, December, 1904.

1. The patient, male, 40 years old, had suffered for three years from a number of ulcerated growths on the auricle, which upon removal, proved to be giant-celled melanosarcoma. The patient eventually died of tuberculosis.

2. A man, 71 years old, had a number of separate warty growths involving the whole of the auricle. They were painful and ulcerated and bled easily. They had existed for six years and cystic degeneration had taken place. Microscopic examination showed that the growth was epitheliomatous.

3. A woman, 50 years of age, had suffered for many years from otorrhoea. When this subsided the canal became obstructed by a hard growth, which arose from the posterior and external walls. After separating the auricle, the growth was found to consist of a mass of bone, as large as a walnut, movable, but imbedded in a deep depression in the posterior wall. The author calls it a "free osteoma."

4. The patient, a girl 23 years old, who had previously suffered from hysteria, had an attack of acute middle ear suppuration. She suffered from intense headache and vomiting and other symptoms which led to the suspicion of intracranial complications, but eventually, the alarming symptoms proved to be hysterical.

YANKAUER.

AN INSTRUMENT FOR THE APPLICATION OF A DISC TO PERFORATIONS OF THE EAR DRUM.*

BY J. WINTER WAMSLEY, M. D., PHILADELPHIA.

The use of discs to cover perforations of the ear drum is not new in itself. Paper has generally been used for this purpose, but within this article is a description of an instrument which is convenient for applying discs of any material and particularly discs of black court plaster, which has been found by the author to be of the best advantage. The object of using black is that it can be better seen. The application of discs was in its original experiment used for the purpose of increasing hearing, and in some kinds of cases it did prove of a certain advantage. In using discs made of court plaster, the adhesive nature of the plaster made its advantage more permanent, to such an extent that when the middle ear cavity was free of disease or discharge resulting therefrom, the disc of court plaster would remain in position, until when shed by the natural exfoliation of the external epithelium, which usually takes about six weeks, it was then found that the perforation in the majority of instances was absolutely closed. No doubt this condition was brought about to some extent by the mildest form of local irritation, causing slight proliferation of the cells about the margin of the perforation, until final closure was produced. It may be, to some extent, that discs of court plaster cause some action like a skin graft. Heretofore, when discs had been applied it was done under great difficulties, either by the use of a cotton applicator or a thin wire applicator made with a loop turned at right angles. To avoid this difficulty the author devised an instrument, shown in Fig. 1.

For the purpose of making it more practicable to apply a disc under all ordinary conditions, this instrument is so constructed that the disc is protected during its travel through the auditory canal, or even a tortuously deflected canal, making it possible thereby to properly place the disc, providing the canal is not too small to allow the insertion of the instrument. There are some instances, however, in which the external canal may be small with a normal middle ear apparatus, and the canal may be so small as to scarcely allow the insertion of even an ordinary wire applicator. Under such conditions it would be next to impossible to apply a disc without a pro-

* Exhibited before the South Branch of the Philadelphia County Medical Society, April 26, 1907.

cedure of drilling out the external auditory canal. It is a well known fact that when spontaneous perforation of the tympanum occurs, even after all suppurative conditions are controlled, the perforation seldom or never heals. If the perforations so made are recent, it is in this form of case, when the middle ear cavity is properly treated, that there is benefit in using a disc to improve the hearing, with the further advantage of the final closing of the perforation by the use of the court plaster disc, which has better, more than all other materials, quality of staying the full length of time to finally produce the result, about six weeks. It is surprising that in



Fig. 1.

some instances of perforation, when a disc is applied, how much hearing is improved, not considering the extra advantage of final natural closure of the perforation by cicatricial contraction.

A convenient syringe (Fig. 2) is herein illustrated, was originally devised in part as a lachrymal syringe. It also includes a middle ear pipe attachment, and is a most convenient syringe as the pipe is placed at about 45 degrees to the axis of the bulb. This allows a clear view upon the part of the operator and the bulb of the syringe has an advantage over the common rod and piston in not needing washers to be looked after, which, if a syringe is laid aside for any length of time are likely to become dry and out of commission.

After acute symptoms of middle ear disease have subsided, and in which the drum may have been lanced, then in a reasonable length of time the middle ear syringe should be used, washing through the perforation so made, using various antiseptic solutions, such as are familiar to a surgeon as lysol, carbolic acid, peroxide of hydrogen, etc., in their proper proportions of mixture. It is then, after all secretions have ceased from the middle ear cavity, that it is desirable to use the disc.

Of the instrument (Illustration, Fig. 1) the large part of the tubing holds the disc. Through the other part of the tubing passes a wire, which is attached at the end to a projecting plug, and this part of the instrument is made of silver to avoid rusting, and is gold plated. The forceps part is readily detached. After secretion has ceased from the middle ear cavity as the result of disease, the perforation is ready to have a disc applied and application is



Fig. 2.

made in the following manner: The end of the instrument which holds the disc is dipped in water and then snapped free of excess. With delicate forceps a disc is grasped by the least edge, and this is dipped in water and snapped free of excess. It is now placed in the cell, the sticking surface out. The disc is tucked in the cell so that there is no projecting edge. It becomes soft in a moment and is ready to be applied to the perforation. If the holder is not moistened, the disc will not hold to the ejecting plug when it is pushed from the cell, and the disc is likely to drop out of place when about to be applied to the tympanum. With this instrument the operator can have a perfect vision to locate the site of the perforation. After the instrument is withdrawn, the disc may hang from its upper edge, not meeting the contour of the irregular surface and angles of the drum, and with a plug of dry cotton on an applicator the disc is pressed to its correct moulding against the tympanum.

At this stage nothing is to be done, but to allow the disc to stay, until by natural exfoliation the disc is cast off.

The ball of the syringe holds about half an ounce of fluid, which is plenty for washing great quantities of matter from the middle ear cavity. It is provided with a cone joint to the canula, so that the syringe is easily separated for purposes of refilling.

It may be stated that in most cases there is no trouble from the size of the external auditory canal in introducing the instrument which holds the court plaster disc. In the majority of instances of perforation following diseased middle ear, there is some good part of the drum left that will allow of attachment for the disc.

1208 Spruce St.

The Curative Influence of Secondary External Otitis. SIGISMUND SZENES. *Arch. f. Ohrenh.*, Leipzig, Dec., 1904.

The author has observed a number of cases of acute middle ear suppuration, complicated by an attack of diffuse external otitis. The latter would subside after a few days, and after it had healed all signs of the middle ear disease would have disappeared.

The author is of the opinion that the inflammation of the canal exerts a curative influence on the process in the middle ear, and quotes other observers who have noted the same phenomenon.

YANKAUER.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

Regular Meeting, April 24, 1907.

THOMAS J. HARRIS, M. D., Chairman.

PRESENTATION OF PATIENTS.

Epithelioma of the Epiglottis. By S. W. THURBER, M.D.

The patient, a Russian, 46 years of age, came to Vanderbilt Clinic on the 17th of April, complaining that for about four months he had been suffering from a feeling of fullness in the throat, some pain in swallowing, so that he is not able to enjoy his meals; and that he has been growing weak.

On looking into the larynx, a growth of the epiglottis was observed. Dr. Thurber presented a model which reproduced the condition very closely, except that the surface was slightly more granular. The growth was engaged in a laryngeal snare and a good portion of it was removed and sent to the pathological laboratory, which returned a report of epithelioma of the epiglottis. The growth was so completely circumscribed, and there seemed so little involvement of the neighboring tissues that a thyrotomy appeared to be the operation indicated. None of the glands of the chin or neck were involved. There was profuse bleeding when the growth was removed, and it was two hours before the bleeding was finally checked.

Perforation of the Septum Closed by a Plastic Operation. By SIDNEY YANKAUER, M.D.

This patient was brought down to enable the Section to see the result of an operation performed according to the method recently described by Dr. Yankauer in an article published in *THE LARYNGOSCOPE*. The patient, when first seen, had a perforation 8 mm. in diameter, situated in the cartilaginous portion of the septum, which had existed for many years. All the usual symptoms of perforation were present, the whistling, the chronic crust formation, and the odor, which interfered considerably with the patient's happiness.

This was the third case which Dr. Yankauer had operated upon by the method described in his paper, and the results were remarkably satisfactory. The operation will be described in detail in a future publication.

Foreign Body Removed from Bronchus. By EMIL MAYER, M.D.

The patient himself would show nothing interesting, but the speaker presented a foreign body which was removed from the left bronchus. The patient, a driver, 28 years of age, while taking some soup on the afternoon of October 30, 1906, inhaled a piece of bone, and it entered into his left bronchus, as was afterward found. He came to Dr. Mayer a month later, with the history that he had been coughing since inhaling this bone, and though he had seen several physicians none of them had afforded him any relief. The physical signs showed some irritation in his left lung. Fluoroscopic examination was negative and Dr. Mayer examined him with the bronchoscope under local anaesthesia, but failed to discover anything that would indicate the presence of a foreign body. Several subsequent attempts were made with the bronchoscope to locate the foreign body, but always without discovering any. These examinations, always under local anaesthesia, did not interfere in any way with the man's vocation. Within twenty minutes to half an hour afterward he was back on his wagon attending to his business. On the last examination (the sixth), a piece of bone was felt, but it could not be removed, then, as the patient was quite exhausted. The next day the patient had a violent attack of coughing, and the bone, which had evidently been loosened by the various manipulations, was brought up, so as a matter of fact the patient brought up the foreign body with the assistance of the bronchoscope.

DISCUSSION.

DR. MOSELEY inquired what position the patient had occupied while the bronchoscope was used.

DR. MAYER replied that at first the patient was in the sitting position, but later it was more convenient for him as well as for the patient that the latter should lie on his back, in the usual position under anaesthesia.

Exfoliated Wall of Frontal Sinus. Shown by F. J. QUINLAN, M.D.

DR. QUINLAN told of a woman patient who had come to his service about a month ago, having been operated upon about ten

days previously for an abscess of the eyebrow. A movable substance was felt beneath the skin, an incision was made removing at same time a complete and symmetrical front wall of the sinus. The patient gave no history of anything that could account for such a condition—no history of trauma, syphilis, or anything which could account for this exfoliation of bone. Dr. Quinlan himself had operated subsequently on this patient for an empyema of the mastoid cells which had developed. Strange to say, about two weeks later the woman developed a general peritonitis, to which she succumbed in seven or eight days. Dr. Quinlan showed the exfoliated bone, which looked as though it had been chiselled out for anatomical purposes, and said that it seemed remarkable that such a sequestrum should have occurred idiopathically, as there was absolutely no history to account for the condition.

Intubation Tube which had been Worn by an Adult Patient continuously for Two Years. Shown by W. K. SIMPSON, M.D.

In reply to an inquiry as to whether the tube had been replaced by another, Dr. Simpson replied no, that it had only been removed the day before, and the patient was doing very well in the matter of breathing.

Some Observations upon the Causes of Voice Failure in Public Singers. By Mr. W. J. HENDERSON of the *New York Sun*.
(Published in full in THE LARYNGOSCOPE, June 1907, page 429.)

Some Observations Upon the Cause of Voice Failure. By D. BRYSON DELAVAN, M.D.

DISCUSSION.

DR. CLARENCE C. RICE, who was unable to be present, sent a few remarks on the subject of the evening, which was read by the Secretary. (Letter herewith.)

The subject is a large one, for the "Causes of Voice Failure in Public Singers," are numerous. To commence somewhat at the beginning, certain public singers are more prone to vocal disability than others, because they have weakened their vocal muscles in the very commencement of their career, in the earliest years of study, before they have made a public reputation. It cannot be too forcibly impressed upon the mind of vocal teachers, the importance of *very slowly developing* the strength of the laryngeal muscles. Most students of the voice are naturally anxious to note rapid progress and if they cannot get this result from one teacher, they are apt to

go to an instructor less conservative. Common sense would demand the slow rather than the rapid development of any set of muscles, that they may not become over fatigued and tired; but there is a reason for special prudence in the strengthening of the vocal muscles.

In the amateur larynx, there is an abundance of soft sub-mucous tissue on the sides, above the vocal cords, and also in the posterior commissure. In the mature larynx, this soft padding has been absorbed by muscular activity. In the amateur larynx, the vocal bands show but little width, because of this protruding, soft tissue, the sides of the larynx being almost convex. In the professional throat, the sides of the larynx are concave, and a much larger width of vocal band may be seen in the mirror. This absorption of the soft tissue can only be brought about, properly, by the constant and very moderate employment of the muscles which approximate the vocal bands.

Undue haste at this stage of vocal development produces impairment of the muscular power, which may handicap the professional singer all his life. These people, under the stress of heavy singing, go to pieces more quickly than those who have laid the foundation in a more conservative way.

The above condition is frequently the cause of the vocal fatigue which young singers so frequently experience. Not many vocal instructors understand this anatomical condition.

Another frequent cause of voice failure in singers who are called upon to perform strenuous roles, is that they are endeavoring to execute pitches which are either above or below those best adapted to the general construction of their larynges, and the length of the vocal bands. A trained laryngologist can, I believe, state quite positively, from the length of the cord observed, the range most applicable to the individual. This season I have seen a baritone go to pieces easily, because he ought to have been cast for tenor roles. We more frequently, however, see voices adapted for medium pitches disastrously endeavoring to execute the highest soprano parts. The vocal teacher should ask the assistance of the throat specialist in determining the character of the singing to be followed by the pupil.

In the special interest with which the laryngologist considers the singer of great reputation, he may forget that the most noted performer suffers from the same usual catarrhal conditions which effect the most ordinary mortal. Every year I see, with amazement, common catarrhal conditions which have been left untreated

in people who have wonderful voices. We are not surprised to find more or less nasal obstruction from deviated septa, but we have recently seen enormous tonsils, very much elongated uvulae, and lateral posterior pharyngeal thickenings which would not have been tolerated in a school child. I need not say that such obstructions to nasal respiration very much increase the effort necessary to produce a large clear tone, and the laryngeal muscles very soon become fatigued. If singing is persisted in after the vocal adductors become tired, congestion of the vocal cords, more or less chronic, and vocal nodules may easily follow, because of the strain and the uneven action of the laryngeal muscles. It requires fine discretion to determine what, if any, in the way of operative work can be safely performed upon singers, while they are executing their season's engagements. A very bad larynx can be made better by some forms of operative work, but a larynx nearly normal can quite as easily be made worse. Even simple nasal operations are followed for a time by a dryness of pharynx and larynx, which embarrass the singer, and tend to produce chronic disturbances in the way of laryngeal congestion and dryness, and muscular fatigue.

A more remote cause of vocal failure sometimes exists because of the foolish and unsanitary manner in which many singers, especially those from the other side of the water, live in New York, during the winter season. Not much can be said in favor of the climate of this winter which has just passed, but we know of singers who never get a breath of fresh air, or indulge in any form of physical exercise. Indigestion, constipation, a coated tongue, a torpid liver, are the results of this method of living, and these easily cause a sluggish congestion and relaxation of the pharynx and larynx. All conditions must be favorable for the very best voice in great singers. I have seen a voice gradually fail, and a vocal cord thicken along its edge, where there was no observable reason for it, except great mental distress. I suppose we ought to say that mental anxiety interferes with that proper vocal production which is absolutely necessary in obtaining great results.

I have no right to take more of your time, and I am sure the matters of proper vocal production, voice placement, intelligent breathing, will all be thoroughly covered by the papers of the evening. I have endeavored to suggest two or three causes of vocal failure which are not so frequently dwelt upon, when this interesting subject is being discussed.

DR. F. E. MILLER: It is doubtful if this Section has ever heard two papers that promise to be of such permanent interest as those read here this evening in the subject of *voice failure in public singers*, by Dr. Delavan and our distinguished guest, Mr. Henderson.

In general, laryngo-pharyngeal observations are so replete with inaccuracies, so far, at least, as voice and voice production are concerned, that it is extremely difficult, if not quite impossible, to arrive at conclusions of value. In order, therefore, to furnish a basis of solid facts, upon which all can equally depend, the study of individual cases should be, for the time being, abandoned, and the thousands of observations made by the different schools and investigators should be ascertained, and exhaustively examined. The physician, the physicist, the singing teacher and the performers should concentrate their combined energies, and work harmoniously, for the purpose of ascertaining a method of voice production, which, if followed, will make a voice failure a thing of the past.

Before proceeding further, it may be well to give a definition of the term "voice failure," something that has not been attempted by either of the essayists. Voice failure may be said to be a more or less rapid decadence of the normal singing or speaking tone, beginning with a marked decrease of power, a deflection from the pitch and loss of quality, which sometimes results, if permitted to continue, in total inability to create sound. This deplorable condition quite often results from pathological conditions as well as from the causes described so ably by Mr. Henderson, i.e., persistent forcing of the tone, singing out of registers, or through colds, and bad vocal attack. *Vocal nodules*, produced chiefly by *follicular tonsillitis*, *paralysis of the vocal chords*, arising from divers causes, such as shock, intestinal troubles and disturbances of the digestive organs, chronic laryngitis, trachoma of the vocal chords, *corditis tuberosa*, over stimulation from spraying, disturbances on the surfaces of the hollow spaces, syphilitic infiltrations of the respiratory tract and hypertrophy of the tonsils are all direct causes of failure of the voice.

It is, of course, perfectly true that certain of these conditions will yield only to medical or surgical treatment; but it has also been definitely established that a great number can be not only cured, but absolutely prevented by recourse to a synthetic method of voice treatment, by which is meant a treatment based on the laws of scientific muscular control.

This statement, no doubt, contains elements of surprise, nevertheless, on investigation it will be found to be not exaggerated. For

in every case of voice failure that has come under investigation, it has invariably been observed that the muscular action has in some way become deranged. Other symptoms vary, according to the individual case, but this condition never varies; it is always present; it is a *sine qua non*. This derangement causes over-contraction of certain interfering muscles, such as the chin, the tongue and the jaw, thereby weakening the action of the voice-producing, or extrinsic muscles, namely, the *stylo-pharyngeus*, *sterno-thyroid*, *levator-palati*, *tensores-palati*, *palato-pharyngeus*, *superior constrictor*, and the *sterno-hyoid*.

Now, inasmuch as one set of muscles may be said to depend on the other, it necessarily follows that, in order to insure the correct action of the intrinsic muscles, the extrinsic muscles must be in a normal condition. The intrinsic muscles alone, except for the mere act of approximation, are practically incapable of voluntary control, but once secure the proper adjustment of the intrinsic and the extrinsic muscles, and the production of the long sought for *standard-tone* is assured.

Doubtless, the sceptics will assert that this is impossible of accomplishment, for it is well known that these persons have concluded long since that the true method of tone production is not destined to be discovered until Gabriel sounds his clarion trumpet to announce the arrival of the millenium. However that may be, I have no hesitation in stating here tonight that exercises have already been devised by which control of the extrinsic muscles can be gained, and the over-contraction in the interfering muscles can be removed. These exercises are not founded on the fantastic theories of unreliable faddists, but are the result of an exhaustive study of the scientific principles governing voice production.

Since the foundation of all good tone production is correct breathing, it may not be thought out of place to set forth precisely what that means. It may then be stated that when a proper method of breathing is employed, the inspiratory effort consists of the contraction of the diaphragm, and the expansion of the ribs. The expiratory effort consist of the relaxation of the diaphragm and a contraction of those muscles of the abdomen and lower back, which pull the ribs inward and downward. By contracting and pushing forward the muscles known as the *rectus-abdominis*, thus causing a violent expulsion of breath, it will be found that the index point of attack is directly below the base of the sternum. For the purpose of sustaining the tone, the ribs must be controlled, in order that they may not fall

too rapidly, and the other muscles must be kept flexible. When this method is properly used, the results may be truthfully described as correct.

To discuss this interesting topic at greater length would be to encroach unduly on the time of others; if, however, I have succeeded in showing that the last word has not yet been said on the question of voice failure, its cause and its cure, I shall have achieved the task to which I set myself when I came among you this evening.

DR. HOLBROOK CURTIS said that in the two papers read so little had been said of the causes of the failure of the singing and speaking voice, in proportion to the great number of causes which exist, that there was very little to take up in the discussion; and for any one who had noted innumerable causes of voice failure, five minutes would seem an inadequate time in which to discuss them.

There were two or three points in Mr. Henderson's paper to which he would refer briefly. In the first place, he spoke of the misdirected efforts of the singers in the Grand Opera House to please the public who buy the seats and applaud vociferously at every expression of the high notes. A great many people have their voices trained for loudness instead of for overtones or harmonics. There are two ways of pleasing in a house like the Opera House—by the quality of tone, or, by the amplitude, and each appeals to a different class. The tone emitted by Sembrich, who has a charming manner of emitting her notes, is full of overtones and fills the largest auditorium. If you get that peculiar resonance in the voice it will carry everywhere, for overtones in the voice are like the electromotive force in electricity. It is the same relationship as exists between volt and ampere. If you have the proper voltage the ampere will do the work.

This kind of singing appeals to the intelligent music lover, but there is unfortunately a class which simply waits for an unnatural explosive climax.

To accomplish loudness the singer is apt to carry the lower mechanism into production of the upper tones, raising the pitch by increasing the air blast instead of by a readjustment of the vibrating segments of the cords. In other words forcing the registers is one of the commonest forms of voice destruction.

Baritones generally have a favorite note which they bellow wide open and that is *re* or *mi*. We know that it has been the cause of their breakdown because we have so often repaired the machinery by making them close the note. So also the open *fa* and *sol* are the

stumbling blocks of the tenor voice. The absence of overtones causes voice failure in that the cords are not called upon to respond in their vibration to the pitch of the tube as does the reed in the vox humana pipe I show you. The cavities above must be brought into action as resonators in order to take the wear off the cords which have been calloused by giving the initial impulse in the method known as the *coup de glotte* or stroke of the glottis.

Well has Mr. Henderson said that the absence of effort causes the fulfillment of tone harmony, for only by absence of all muscular tension can the tones be replete with overtones, and shown to be mathematically correct by Koenig's manometric flames; for after all, true harmony is the completion of the mathematical tone equation.

The so-called methods of singing teachers are a curse upon voice training, for only by the entire absence of anything artificial can we produce the perfection of tone. The function of the teacher should be to correct the unnatural, and exercise the muscles in the equilibrium which has been provided by nature, rather than to accentuate the activities of certain groups.

DR. R. C. MYLES said that from his observation in Europe and this country he felt that the true method of teaching was one of imitation. The pupil should imitate some one who is able to produce the note desired. He suggested that teachers of singing should form an association, where this question could be discussed and some conclusion reached. Everything seems in confusion at present. According to his observation, many singers lose their voices too early in life. Is it the fault of the doctor, the teacher or the singer? We observe many voices which have been lost by pathological conditions. These have been allowed to continue because the patient was a singer, and some one was afraid to do the right thing. One of the singers who had been mentioned tonight "broke down," and her ethmoidal turbinates had undergone polypoid degeneration. He had removed the turbinal tissues, and today she is singing as well as ever. Such conditions were of frequent occurrence. He had often found pathological conditions which had existed for years, and the poor singer had been trying to sing in spite of them. He had seen tracheitis slowly extending with its consequent thickening of the sub glottic region, thickening of the mucosa over the crico-aryteno-thyroid muscles, which prevented the proper vibrations of the so-called cord. On the other hand, there are many cases of arthritis of the arytenoidal, and crico-thyroidal joints. He had had occasion to treat several cases of infected tonsils causing serious impairment

to the voice. The cervical glands in these cases, are enlarged and affect the pneumogastric nerve and the veins; there was more or less pressure upon the nerve filaments of the lingual muscles, interfering seriously with the voice production.

The subject is a broad one, and he would advocate that the human chest and all of its adnexa—muscles, diaphragm, etc., be trained independently of the teacher or method, and then have the singing teacher apply to the voice the methods which the consensus of opinion would advocate for the production of the best voice.

If the great singers would teach more while they are at their best—not wait until they begin to break down—we would have more worthy successors to their methods.

We are making sound and safe progress in procedures and technique for the removal of pathological conditions, without injuring the voice production.

PROF. SCRIPTURE, formerly of Yale University, now of Columbia, said that he had come to listen and to learn, and felt that he had passed a most valuable evening. Dr. Delavan had suggested that it would be a great convenience if the singer's voice could be tested from time to time, so that improvement or failure could be noted and a record obtained of the various methods of instruction in singing. Some methods have been devised for doing this which are very laborious and expensive, but they are in no sense practical—the gain from months of work being only a single fact. There is one method, however, which is very convenient and the apparatus for which can be set up by any one in his office at small expense, and by means of which he can test his patients with certain conditions of voice.

Professor Scripture then sketched on the board a figure, showing what he had been doing for the Carnegie Institution in the study of the attack of tones by singers. Suppose you put in front of the singer's mouth a small receiving trumpet, and from that trumpet bring a rubber tube to a very small manometric capsule, covered with the thinnest kind of rubber membrane. On top of that place a very fine straw lever, the tip of which writes on a smoked drum. When you speak or sing into this instrument, the lever records the pressure of the air and the vibrations from the larynx.

Records of the three kinds of attack of a tone by a singer were then reproduced. The breathy attack showed an emission of the breath before the vibrations begin. The record of the *coup de glotte* showed an explosion of air with strong vibrations. The clear begin-

ning showed no sudden deviation in the pressure line; the vibrations almost instantaneously reached their full intensity in a well-trained voice.

With the same apparatus it is possible to study the vibrato, the tremolo, the trill, the rate of expenditure of the breath, the breathiness of a tone, etc. The variations and inaccuracies which are too fine to be heard by the ear can be seen in the records.

The method can be used to make a scientific analysis of a singer's voice, to measure the changes that occur in it during training, to detect the symptoms of voice failure, and, in many cases, by an appeal to the eye to correct the faults of the singer.

DR. EMIL MAYER said that he had little to add to the subject which had been so thoroughly and ably presented. Dr. Myles had brought up one point, which has been discussed over and over again—how far may we go in certain operative attacks on growing children or young adults who have aberrations in the vocal regions. Every laryngologist has sometime encountered the objection that if the tonsils were removed the patient would have a falsetto voice forever. Of course that has been denied time and time again, and yet there seems to be a popular prejudice on this point, though absolutely without rhyme or reason. The practical value of such a presentation as had been made this evening is an impetus to the further and more careful study of these conditions, and it was a privilege to hear the expressed opinions of one who had perhaps listened to more human voices than any one else present, who had seen and heard the great singers in their height and in their failure, who was perhaps, able to note at once the cause of the failure, and who surprised us when he discovered breaks in singing when we had thought the rendering perfect.

DR. W. K. SIMPSON said that he thought that this was a matter which ought to elicit from the Section all the discussion possible. After a great deal of attention given to the subject, he himself felt more convinced every day that as a matter of bad method of singing versus over-use of voice, the question of deterioration can be summed up in over-use. Professional singing is an unnatural use of the human voice. Voice was given to man for the purpose of maintaining conversation, as the legs were given for the purpose of walking—when we run, they give out; the eyes were given for ordinary observation, when used with the microscope or overstrained, they give out,—and so on through the whole category of human functions. Certain individuals are better endowed with sing-

ing voices than others; some can run longer than others, some can see better, some can hear better and longer than others, but age and over-use soon show their effects. Certain nationalities seem better endowed with singing voices than others. What nations compare with the Italian in this respect? They are natural singers. There is no American type of singing. Those who have examined Italian singers find less laryngeal trouble. They are better endowed in this respect than other nations.

Then there is the question of large houses. There are every-day singers, every-day soloists, who cannot satisfactorily fill any large auditorium. If you are down in the orchestra seats or near the stage you will hear very well, but if you are up in the first and second galleries you don't. There are only a very few voices which can satisfactorily be heard in all parts of large auditoriums. Take these same voices, put them in some smaller room, and you get pleasure from hearing, but not in the large halls, or opera houses, and it is this effort to fill large areas that is such a potent factor in causing failure. He had once asked a celebrated musician why it was that taking all the philharmonic and symphony societies of the world where you find expert musicians—why it was that among all these thousands of expert musicians you find only one Ysaye, or one Paderewski? He replied that it was a "God given gift." That settles the whole question of the ability of the individual to hold his voice in singing. I have not gone into the subject of physical causes of voice failure other than over-use; but it goes without saying, that in order to maintain the singing voice in its purity—before advancing age sets in—there must be perfect health, proper care of health, avoidance of alcohol and tobacco, abstemious living, mental poise and perfect mucous membrane conditions of larynx, pharynx, naso-pharynx and nose, and an absence of deformities of these parts.

DR. F. J. QUINLAN said that he did only the ordinary work of a laryngologist and did not know much about singing, but it seemed to him that there was a simple way out of this question if one considers the physiological and anatomical structures of the throat. Look at the bird; he does not worry about his nose, his bill, or his gullet, but simply opens his mouth and lets the notes fall naturally. We must consider three conditions. We have two big cylinders filled with air, and from these an outlet. We all know that, according to the laws of physiology, as the air comes through the gullet it produces a squeak like that of a pig, and unless this is reinforced by

the action of the pharyngeal muscles and receives its impulse upward, backward, or forward,—if it fails to get this, or does not get the proper impulse from the resonating cavities of the head, the voice is a failure, just as much in speech as in singing. Dr. Simpson had just said that we cannot always run. No, and we cannot always sing. We have three sets of muscles employed in the larynx, the opening and closing, and the auxiliary or those employed for singing purposes. He had seen a few throats, but most of these patients apply for treatment when their throats are defective, and not obeying the laws of health.

He had come tonight hoping to learn much, but went home disappointed, feeling that he had added little if anything to his store of definite knowledge on the subject under discussion.

DR. J. A. KENEFICK said that he had greatly appreciated the papers heard tonight on this important subject which concerns a large number of people in every community, and which should be studied with the utmost seriousness in order to reach some proper method of solution. A point which impressed him more forcibly than ever, was one which he had dwelt upon in a paper read before the Section in 1903. If the individual feels inherently the desire to sing, and is blessed with the three G's to which Dr. Simpson had referred, one of the first things which that individual would do, would be to consult a teacher who would tell him that his voice must be trained. The next step should be that the teacher would first determine whether that individual had a perfect singing apparatus. If that were determined in the beginning, many of the so-called failures which occur in succeeding years would be avoided. Every one present had seen persons who have studied in this country and abroad who have always been victims of some difficulty which no teacher has been able to overcome. An examination would reveal some pathological obstruction whose presence was fatal to any proper emission of tone. He therefore repeated that if there was one point which impressed itself upon him more strongly than any other, it was that those who desire to take up the cultivation of the voice should first call upon some reliable laryngologist and learn whether the vocal apparatus was ready and fit to be put through the great strain required by voice cultivation; that point being determined satisfactorily they could then go ahead.

DR. DELAVAN, closing, said that the subject was too broad to be thoroughly taken up in one evening. His own views on the subject could be summed up by saying that the need of the present

time, considering the great amount of study which had been given to vocal training, and the large number of able men who had devoted themselves to it, is the influence of a genius who should devote himself to the study of what had already been done to eliminate the useless matter, to recognize that which was good, and to place the art, as far as possible, upon a scientific basis. It might be impossible to make a science out of an art, and it was improbable that musicians would ever be created upon purely scientific lines; the art, however, could be placed upon a more scientific basis than was the case at present. Until something of this kind was done, we would probably talk, discuss, read papers, and combat each other in the future as had been done for many generations in the past.

A Laryngeal Medicator for the Patient's Use. Presented by SIDNEY YANKAUER, M.D. (*To be published in full in a subsequent issue of THE LARYNGOSCOPE.*)

Should Cases of Acute Diffuse Purulent Otogenic Leptomeningitis be Operated upon? R. SOKOLOWSKY, *Arch. f. Ohrenh.*, Leipzig, Dec. 1904.

In the case here reported, the presence of meningitis was established by the concurrence of many classical symptoms: fever, rapid pulse, optic neuritis, rigidity of the neck, Kernig's sign, vomiting, stupor, and the presence of pus cells and bacteria in the fluid obtained by lumbar puncture. After the removal, by one operation, of large quantities of pus and cholesteatomatous masses, which had invaded the labyrinth and the facial canal, and had perforated the roof of the tympanum to the dura, and a second operation to drain an abscess surrounding the sinus, the patient made a slow but complete recovery.

The procedures resorted to in this case were justified, not only by the result, but also by five similar cases which the author quotes from literature, and he concludes that, in these cases, the operative interference, though frequently hopeless, may afford the patient an additional chance for recovery.

YANKAUER.

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LABYRINTHINE SURGERY.

About fifty years ago the distinguished English otologist, Wilde, dogmatically asserted that it was not incumbent upon aurists to become intimately acquainted with the anatomy of the internal ear, because in this region surgical intervention was out of the question.

If Wilde were living today, he could learn that last year Hinsberg, in a report to the Fifteenth Congress of German Society of Otologists, collected for purposes of study 102 cases of operation on the labyrinth—not counting the reports of cases of simple removal of sequestra. Of these, 9 were practically healthy labyrinths, the operation being done for the relief of vertigo; the remaining 93 being done on account of an existing suppuration or necrosis.

That interest is now being centered upon the labyrinth in all parts of the world is evidenced by the fact that it was made the subject of a symposium at the International Congress of Bordeaux in 1904, of the last Italian Congress of Otology, and at our own Society of Rhinology, Laryngology and Otology just ended. Of those who have contributed something of value to the subject, we should mention especially the work of Jansen, Hinsberg, Boesch and Friederich in Germany, Milligan, Tilley, Grant and Lake in England, Gradenigo, Rugani and Poli of Italy, and Lermoyez and Bellin in France, and in our own country the recent brilliant work of Richards of New York.

No one is fully abreast with the subject; furthermore, there has not been read the masterly discourse by Brieger of Breslau, on the pathological anatomy of the labyrinth, and the contribution of Professor Stefani of Padua, and the scientific paper of von Stein of Moscow, bearing particularly on the subject of vertigo and equilibration.

If in the past we have been taught to believe that the labyrinth is, surgically speaking, a negligible organ, because practically immune to the encroachment of disease processes going on in its immediate proximity, we may be obliged, in the light of recent investigation, to revise our views and to regard the labyrinthine as a vulnerable area.

If we may believe Jansen, the cases of pyolabyrinthitis complicating suppurative otitis media outnumbers all the intra-cranial complications taken together.

Friederich found that in about 7,500 cases of suppurative ear at the clinics of Halle and Kiel, there was a record of 68 cases of suppuration of the labyrinth, showing that this complication may be expected in nearly one out of every hundred cases.

These cases were nearly all diagnosed either upon the operating-table or post-mortem. Seldom is a pyolabyrinthitis diagnosed beforehand, owing to the fact that the clinical demonstration of this disease is difficult and based upon signs and symptoms which at the present time are not usually sought for or properly interpreted.

In the future it is imperative that more study should be devoted to the non-acoustic labyrinth, for it is in this part that arise the distinctive symptoms due to disturbance of the equilibrating functions, and experience shows that involvement of the vestibule and semi-circular canals precedes involvement of the cochlea.

We have before us recent numbers of Italian journals of Otology and Rhinology (*Archivio Italiano di Otologia*, Torino, 1907, xviii; *Bolletino delle Mal. delle Orecchio della Gola e del Naso*), containing the proceedings of the last Italian Congress of Otology. We note with interest that much attention is given to the physiology of the non-acoustic labyrinth, and to clinical methods of diagnosing labyrinthine disease, by such authors as Cradenigo, Nuvoli, Rugani and Ostino.

According to Rugani, a study of the muscular sense in labyrinthine disease should be made from both a static and dynamic standpoint, and he describes in detail dynamometry, ergographia and cinesigraphia in their applications to such cases.

Ostino has an article in the clinical examination of oculo-motor troubles in ear diseases, in which he dwells at length on the characters of oculo-motor troubles originating in lesions of the non-acoustic labyrinth, and Ostino and Rugani have joint contributions in which they map out in detail a scheme for clinical examination of the non-acoustic labyrinth for symptoms of both the asthenic and astasic type.

Gradenigo, discussing these papers, denies the existence of a true labyrinthine tonus, in the sense that it is understood by Ewald. The apparent loss of muscular force, he explains on the theory that

the patient whose static organ is disturbed is obliged to expend energy that the normal individual does not, in merely maintaining his equilibrium, and that this muscular fatigue is produced.

The questions are intimately allied with diagnosis of labyrinthine troubles, and it will require painstaking observations with such instruments of precision as the recently devised dynamometer-graph of von Stein, or the ergograph of Maltese, to determine eventually their exact practical value.

We cannot insist too strongly on the use of all measures that may aid in the diagnosis of this insidious complication, which, according to recent statistics, is present in at least half the deaths that take place from intra-cranial affection following ear disease, and is probably in many more cases than was formerly thought the road of infection to the brain.

The clinical picture upon which we are accustomed to base a diagnosis of cerebellar abscess will answer almost perfectly for labyrinthine disease. Vertigo, nausea, vomiting, cephalalgia, nystagmus and disequilibrium are symptoms common to both affections.

How valuable, therefore, to have any clinical data which will aid in deciding in certain cases whether our surgical activities should be directed toward the labyrinth, or whether we should at once open posteriorly and explore the cerebellum!

Of the indication for operating, of the relative value of slight and extensive attacks upon a suppurating labyrinth, of the technique to be followed, much has yet to be learned.

The actual benefit of any intervention at all cannot be decided until we can compare the results of the operated cases with those where the diagnosis has been certainly established and the condition allowed to progress without interference. Outside of the question of mortality, earnest consideration must be given to the consequence of surgical destruction of the labyrinth in the patients that survive. Cheatle found that the vestibule and canal could be removed without loss of hearing in case of pyrolabyrinthitis, and Lake made the same observation in which the removal of these parts was undertaken for the relief of vertigo in a non-suppurating labyrinth.

Richards states that in one of his cases in which the cochlea, as well as the vestibule and arches of the semi-circular canals, were removed, the patient could hear afterward all of Hartmann's set of forks, and the thirty-five thousand Koenig's rod.

Doubt naturally arises as to the permanency of these results; and while awaiting further data to guide us in our procedure, we ought constantly to bear in mind the possibility of infecting a sound organ and destroying not only its own highly important function, but the danger also that the infection may be transmitted to the intracranial contents.

Too much stress, we feel, cannot be placed on this aspect of the subject, in view of the strong tendency among aural surgeons to sacrifice exact clinical methods of study to the exaltation of a showy technique, and to deceptive immediate results.

Let us accept these results only for what they are worth, and interpret them in terms of actual benefit to the patient, and let us not fail to faithfully exercise a solicitous surveillance over all diagnostic clinical information that may be utilized in formulating indications for operation.

If we approach the problem of labyrinthine surgery with these principles in mind and continue to be guided by the very ancient but still laudable motto, *primum non nocere*, we will find that inevitably we shall be led to attempt, with regard to disease processes in this little known locality, to accomplish the greatest possible good with the least possible intervention. W. A. WELLS.

The Abuse of Devices for "Curing Deafness." SIGISMUND SZENES
Arch. f. Ohrenh., Leipzig, Dec. 1904.

After thoroughly testing a certain device, which had been advertised in the daily papers as a "sure cure" for deafness, and demonstrating that it was utterly valueless and even harmful, the author, acting in the name of the otological section of the Königl. Gesellschaft der Aerzte in Budapest, appealed to the Hungarian Patent Office, and succeeded in preventing the granting of a patent for said device.

(The opening clause of the legal form of application for American Letters Patent would offer sufficient ground for similar action in this country.—Y.) YANKAUER.

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ORIGINAL COMMUNICATIONS.

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HYSTERIA OF THE EAR.*

BY CHRISTIAN R. HOLMES, M.D., CINCINNATI.

Systematic writers upon hysteria do not lay much emphasis upon the aural manifestation of that disease and yet some of the most important cases, cases in which a mistaken diagnosis may possibly bring about conditions menacing the very life of the patient—are brought to the aural surgeon for diagnosis and treatment. In most of these cases, of course, the hysterical character of the symptoms is obvious upon even a cursory examination but occasionally a symptom complex is encountered which defies a proper analysis except after long and careful observation and there are not a few cases on record in which serious errors in diagnosis subjected the patient to grave surgical operations with all their attendant dangers.

An examination of the numerous clinical histories which can be found in the literature shows that hysteria can simulate every known organic lesion of the ear with more or less fidelity and has added to the catalogue a long and important series of peculiar aural reflexes in which various parts of the ear play the part of a hysterogenic zone or stigma.

As the pathology of hysteria is unknown it will not profit us to discuss the various theories advanced as they must be left to the neurologist for study and a final determination of their value. What concerns us ultimately, however, is the question of diagnosis. It is on this point that we will be appealed to as consultants and we must be prepared to decide some very difficult problems promptly and with authority. I am not aware that any one has, as yet,

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attempted a systematic classification of these cases. My study of the subject, however, would indicate that there is a natural classification which would assign to each case its place in one of five categories. This classification is as follows:

1. Cases in which there is no evidence of any disease of the ear.
2. Cases in which a normal or abnormal ear is the seat of hysterogenic zones—as where certain sounds produce reflex phenomena in distant parts of the body.
3. Cases in which there are abnormal appearances in the ear which can be explained, and which the subsequent history of the case demonstrates as, temporary nervous and vascular phenomena (e. g., angio-neurotic oedematous patches, changes in color, etc.)
4. Cases in which there are slight pathological changes in the ear—real, but insufficient or not of a character to account for the symptoms complained of.
5. Cases in which the hysteric inflicts more or less damage upon the ear for the purpose of exciting sympathy or to induce the performance of an operation by the aural surgeon.

Every physician who has served as an interne in a general hospital or who has had experience with general practice knows how necessary it is to take into consideration all the circumstances—both hereditary and environmental—that surround these hysterical cases, and in the course of our inquiry we will see that in some of the cases submitted to us as specialists in which an hysterical tendency is not suspected by the friends or attending physician it will be the opinion delivered by us that aural disease is certainly not present that will first establish the positive diagnosis of hysteria. It is therefore incumbent upon us to be thoroughly familiar with all the signs of this neurosis and to bear the possibility of its presence always in mind, especially when we are confronted with cases in which the symptoms bear an obvious disproportion to the physical signs.

Let us now discuss the various phases of aural hysteria in accordance with our classification:

1. Cases in which there are no evidence of any disease of the ear.

Gilles relates a typical case of this kind. A twenty-one year old hysteric for the two years following upon an emotional disturbance was more or less deaf from time to time. The deafness showed it-

self whenever one spoke to him suddenly. Gilles speaks of it as a paresis of accommodation of the ear. There was no disease of the ear.

Cases of this kind naturally are somewhat rare. In the first place a very large proportion of all the inhabitants of the temperate zone are suffering from chronic catarrhal alterations of the upper air passages and the ears. In the second place practically all hysterics are anaemic and otherwise below normal in resisting power. It follows then that few hysterics will show absolutely normal ears and we can expect to find some slight alterations of a catarrhal character even in cases where we are perfectly satisfied that the aural symptoms are purely hysterical.

2. Cases in which a normal or abnormal ear is the seat of hysterogenetic zones.

These cases are somewhat more frequent than the preceding. They are of several types but probably the most frequent is that connected with sound perception. Steinbrügge has recorded a typical case. An hysterical man of 45 years of age had suffered from peculiar convulsive attacks for 15 years whenever he heard instrumental music. These attacks dated from a severe fright. Other sounds even when they were of great intensity made no particular impression on him. The reflex symptoms included sensations of cold over parts of the body, disturbance of respiration, rotary movements, etc. There was reduced hearing and a chronic discharging otitis media. No hyperaesthesia of the acoustic nerve could be determined.

Voss also records an interesting and instructive case of a character that is much more likely to come under our observation than that of Steinbrügge's. A nineteen year old girl was operated upon for a chronic purulent otitis and mastoiditis. A cutaneous flap was made from the lower portion of the meatus; the posterior wound sutured and a tampon inserted through the meatus. Change of dressing on the fifth day, removal of sutures, primary healing. There was now a complete hemi-anaesthesia of the body on the operated side, in other words, hysteria. Thereupon the tampon was removed from the ear and not renewed, but merely an outer dressing applied. Prompt recovery.

Voss, in his article on "Diseases of the Ear in Hysterical Subjects," uses this case to illustrate and enforce his contention that packing of the wound cavity after operations for acute or chronic mastoid disease should not be undertaken in nervous or hysterical

adults or children. We have all had painful and disagreeable experiences in years gone by with cases of this character and can remember the terrible scenes accompanying the frequent dressings of these wounds. It is indeed fortunate that for some time past we have recognized the positively harmful effects both upon the repair process in the wound and the nervous system of the patient of the old method of tight tamponade, and that we have adopted improved methods of technique that give to the patient less suffering and to the surgeon more satisfactory results more rapidly attained.

3. Cases in which there are abnormal appearances in the ear which can be explained as, and which the subsequent history of the case demonstrates as, temporary nervous and vascular phenomena.

Numerous observers assert that in the course of hysterical manifestations in which the ear is the seat of an alleged disturbance of function that physical changes do occur, passing away without leaving behind them any trace of their existence as soon as treatment of the hysteria results in a disappearance of the aural symptoms. These are important observations and a knowledge of them will help us to avoid what might have been serious errors in diagnosis. Of course no one could fail to recognize the significance of such a phenomenon as a patch of angio-neuritic oedema, an herpetic vesicle or a psoriatic "drop"—but in some cases the changes are limited to a darkening of the color of the drum membrane—it is described as dark gray—or to more or less circum-membranous or circum-malleal injection. These cases certainly must be difficult of diagnosis. It is even of record that a perfect picture of myringitis has been presented—without, however, any of the subjective symptoms that go to complete the clinical history of that disease. Continued observation, conservative and nice discrimination, and a proper appreciation of the nervous phenomena other than those appertaining to the ear, will be necessary to properly guide us in these cases.

It is possible that some cases of vicarious menstruation, where the blood flow is from the ear, should be placed in this class. Gradenigo describes a case occurring in an hysterical girl of 15 years. Blood came from the ear at the menstrual periods whether the regular menstrual flow from the genitalia appeared or not. Removal of small blood clots from the depths of the external auditory canal revealed "six or eight reddish points of the size of the head of a small pin," which Gradenigo concluded were the mouths

of ceruminous glands. The drum membrane was absolutely intact. In Shambaugh's case, cauterization of the bleeding point caused the aural periodical hemorrhage to cease, but it is not mentioned in the report of this case whether or not there were nervous or hysterical phenomena connected with the ear symptoms or observed in the intermenstrual period.

4. Cases in which there are slight pathological changes in the ear—real, but insufficient or not of a character to account for the symptoms complained of.

This class includes by far the largest number of cases. As already stated the hysteric is almost invariably below par not only as regards the inhibitory mechanism of her will power, but also as regards the resisting power of her tissues to the ordinary wear and tear of physical existence. Therefore, we find in a very large proportion of all cases certain more or less marked, or more or less serious, lesions of the ear. Diagnosis, of course, is a fairly easy matter in those cases in which the allegations of subjective symptoms by the patient are out of all proportion to the actual findings in the aural system by modern methods of diagnosis—but a certain number of cases present themselves in which the difficulties of diagnosis are very great. I have seen a case, for instance, in which the cerebral symptoms of a fully developed otitic meningitis, in a hysterical girl of 12 years, closely simulated and were regarded as a purely hysterical mental exhibition until within a few hours of death. Even the temperature range is not an absolutely trustworthy measure of diagnosis between the two conditions—especially as the hysteric is so frequently subject to digestive disturbances with intestinal putrefaction and various signs of an auto-intoxication of which an elevated temperature is not the least frequent. The differential blood count is probably our most certain reliance when the suspected hysterical manifestation simulates an inflammatory otitic condition and it is quite possible that this might have to be repeated a number of times.

We must never forget that many of these patients are quick witted, wonderfully determined to deceive and some of them more than willing to undergo serious operations—if thereby they can secure the attention of doctors and the solicitude of nurses and the anxious sympathy of their friends. From the questions of one physician they learn or infer what symptoms or signs are sought for in the disease that they desire to exploit so that by the time they are consulting their third or fourth medical adviser they are fairly well

up in their part and often act it so admirably as to be able to deceive, at least for a time, men of skill and experience.

Voss mentions an hysterical woman who succeeded in having her mastoid opened by feigning a mastoiditis, and then details a case of his own. A woman, 45 years of age, presented herself with the drum bright red and swollen as in acute otitis media just before perforation. There was severe otalgia. He treated her palliatively as a case of acute otitis media for three days and as the condition did not improve performed paracentesis. The tympanic cavity contained nothing but air. In 24 hours the incision closed—no secretion appeared on the occluding gauze but the conditions were the same as before. Voss now made a diagnosis of a neurotic and not an inflammatory condition and prescribed bromides and valerian. In 24 hours the membrane appeared normal and the pain was gone.

It is in this class that we must put most of the cases of hysterical otalgia or hysterical hyperaesthesia of the acoustic nerve. A physical examination of the ear reveals possibly only some slight catarrhal changes—or it will reveal areas of hyperaesthesia or analgesia of the skin in the canal, over the auricle and even down the neck to the clavicular region, the shoulder and the chest wall. These anaesthetic or hyperaesthetic areas should always be diligently sought for as sometimes they are the only hysterical manifestations upon which a diagnosis can be made.

Finally we have 5—Those cases in which the hysteric inflicts more or less damage upon the ear for the purpose of exciting sympathy or to induce the performance of an operation by the aural surgeon.

It is probably the existence of these anaesthetic areas which permit and induce the hysteric to sometimes inflict upon herself visible injury. Sometimes the injury is practically nil as in those cases where some filthy substance is introduced into the external auditory canal—but, if we were permitted to judge from the standpoint of a normal person, the discomfort would be extreme—even unbearable.

More often, however, there is slight but actual physical damage done. I had a case under my care a few years ago. A young girl about 19 years of age, tall, slender and highly neurotic was brought by her parents on account of neuralgic pains about her eyes and nose. There was a slight posterior hypertrophy of both inferior turbinates and a half dioptric of astigmatism, under homatropin, which was rejected later. When it was evident to her

that she was about to be dismissed from further treatment she was brought in great alarm by her parents one morning—her right ear plugged with cotton—with the assertion that the ear had been bleeding copiously during the night as was evidenced by the blood stained condition of her pillow. The cotton taken from her ear was stained with blood, it is true, but an examination of the ear revealed that the latter was normal in all respects. There was not even a slight abrasion. Instituting a search for the source of the blood stains on the pillow and the cotton with which she had deceived her parents, I found several recent abrasions covered with moist blood clot on the right side of the nasal septum. I informed the parents of the conditions and, of course, was met with indignant protests—but the evidence was complete and unimpeachable.

Very recently I have had under my care a somewhat similar case. A woman, aged 28 years, was brought to me by Dr. Duncan, of Burlington, Ky., who was quite convinced that it was a case of hysteria, but wished to have his opinion fortified by an expert examination of the ears, nose and throat. She gave a history of having fallen from a horse seven years before, striking on the right side of the head. She was unconscious for twenty-four hours. Two years ago she had headaches and a pain in the right ear followed by a discharge of pus. With the pus were also discharged at various times pieces of bone which aggregated in all about a teaspoonful. Other pieces of bone were discharged from the ear into the pharynx and were coughed out and a couple of pieces were also passed out through the right nostril. This astonishing statement was corroborated by her husband who stated, as conclusive evidence, that *he had seen the bones*. Since then the ear had not given her any trouble until two weeks ago when there was sudden and severe earache followed by a displacement of the lower jaw to the left and tenderness and retraction of the neck muscles on the right side. All movements of the head were painful, and on account of the displacement of the jaw, the mouth could not be closed and saliva was constantly drooling. The patient entered my consulting room the very picture of abject misery—pale, haggard, stooped—the head retracted to the right, barely able to walk across the floor and almost unable to talk. I was almost willing to believe her statement that she had tasted neither food nor drink for two weeks. The physical examination revealed an exquisite tenderness over the right mastoid but otherwise

a perfectly normal ear. I agreed perfectly with Dr. Duncan in the diagnosis of hysteria and determined to try the power of suggestion. I assured her positively that she would speedily recover from her distressing symptoms, admitted her to a room in my hospital and sent her husband home. After admission to the hospital she refused to take her internal medicine (Elix. Sod. Brom.), alleging her inability to swallow—although later she was found to have drunk water out of a glass accessible to her. After she had fallen asleep, quite firm pressure made over the sensitive mastoid elicited no response. On the second day the nurse reported that the right ear was discharging freely—an examination, however, revealed another trick. She had endeavored to fill the external auditory canal with a thick muco-purulent secretion which she had probably coughed up and introduced with her fingers,—the inner half of the canal and membrana tympani were found dry and normal. Up to this time there was total deafness of the right ear both for voice and tuning work. The treatment consisted of a mild current of electricity to the ear, leeches over the mastoid and suggestion. At the end of five days all of her severe and disagreeable symptoms had disappeared, her hearing was completely restored and she returned home cured and wonderfully improved in appearance.

I have been surprised in my study of the literature to find so few cases of this character. Cases of simulated or of functional deafness, of reflex neurosis and curious aberrations of hearing, are abundant but cases in which a deliberate attempt was made by mechanical means to induce the patient's family and friends to believe that a serious disturbance of the ear was present are very few.

One of these cases from the literature, I will recite to you, in the first place because it is really a typical case of this character and in the second place on account of its quaint phraseology and its shrewd analysis of the phenomena presented. It is found in a curious old volume published in Breslau, in 1726, under the title of "*Sammlung von Natur und Medicin wie auch hierzu Gehörigen Kunst und Literatur Geschichten. Frühlings Quartel.*" This old book is written in a curious mixture of German and Latin and printed in a still more curious mixture of black letter and Roman type. The following is a translation of the author's account of the case: "Another case is reported by Dr. Joh. Pet. Wahrendorff of Liebnitz; a girl of 20 of phlegmatic temperament who passed peb-

bles through the ears, nose, mouth and uterus; and finally, sand through the bladder" (he describes the sand as like that used by the German servants for scouring floors). "The pebbles resembled so closely those found in the creeks and fields and were so unlike anything found in the human body that he thought it must be a case of fraud. On visiting said patient a small pebble protruded from the left ear and the patient was sneezing violently. The parents, who were honest and pious people, assured him that these paroxysms of sneezing continued until the offending pebbles were forced either from the nose or ears. If the pebbles occurred in the mouth there was violent coughing and finally coughing with ejection of the pebble. If the pebble was to be passed per uterus or vaginam the patient complained of pain and pressure in the abdomen. Menstruation regular every fourth week. The color and size of the pebbles differ, some are black and others white, large and small, depending on the part of the body from which they come. The parents had collected quite a large number of these pebbles, but they did not collect or save the sand. The suggestion of witchery had been made but as the parents, who are very pious people, had assured the doctor that there was no deception and no witchcraft and as the pebbles so closely resembled those found in the fields and creeks, the doctor was very much puzzled. In addition to the sand the patient's urine had at various times assumed different colors, red and bloody, then black as ink and finally green. Two of the pebbles from the ear weighed five grams each, one was white, the other black. One from the mouth which was black weighed nineteen grams. One from the anus, white in color, weighed one drachm two scruples; another, one drachm; this one was also white. One from the vagina, ten grams. After a careful examination of the pebbles the following conclusions were reached:

1. That they were ordinary and real pebbles.
2. That they could not have been generated in the human body but certainly must have gained entrance from without.
3. That the same must necessarily have entered the body in their present shape and size, through the act of deglutition just as they leave the body through the excretions; and this being so the patient must know for a certainty when and how these pebbles reached her abdomen.

4. * * * *

5. Had they been carried from the stomach through the blood into the emunctories, this could not have occurred in the ears, nose, vulva and urethra without laceration of the meatus and without hemorrhage.

6. If they had been placed into each "emuctorium externe" this is not so strange, because it would be easier to do by the human hand, than for a supernatural power to do so.

7. It is to be remarked that the power (which did it) acted in a sensible human way for those in the nose and ears were small; those in the anus and vulva large; and none at all in the eyes; and if the devil had done this and had acted in a supernatural way, he would not have followed this order and would certainly have lacerated the external meatuses. The author finally concludes that the girl did this herself—despite the parents' statement to the contrary. Later he concludes that if the girl had been bad enough to do this she undoubtedly colored her urine by drinking various colored inks of her father's, he being a teacher and requiring inks of different colors."

The diagnosis of these cases often presents unusual difficulties and I have been taught that it is unwise to make a hasty diagnosis of hysteria in those cases, occurring as they so frequently do in neurotic subjects, where the initial examination reveals no adequate cause for, say, a persistent and earnest allegation of pain in and about the ear. We are arriving now at a wider and more accurate knowledge of the pathology of the nose and its accessory cavities and we know that it is quite possible for a diseased ethmoid cell, or sphenoid cell, or for an hypertrophied middle turbinate, to produce reflex disturbances in the ear so out of all proportion to the apparent local disturbance that the real cause of the ear trouble can be overlooked even by careful observers, for a long time. I recall one case occurring in a young girl who alleged pain and paraesthesia in the ear and who was examined by me repeatedly with a negative result. She was of a neurotic temperament and passed through the hands of one neurologist after another. She had an ocular muscular disturbance which was corrected by tenotomies and glasses. Hereditary syphilis was suspected in her case and she was energetically treated. Finally it became slowly and increasingly evident that she was suffering from an ethmoiditis and the inflammation of the accessory cavity with its extension to neighboring structures gradually unfolded

itself as the cause of the aural disturbance which was advancing into a confirmed chronic catarrhal deafness. And yet the original diagnosis of hysteria seemed to be justified up to the time of the discovery of the infected ethmoid cell. In another case, that of a middle aged lawyer, persistent pain in the mastoid without any visible lesion was diagnosed originally as hysterical mainly on account of the neurotic temperament of the overworked and worried patient. Long continued observation of the case finally convinced me that there must be a real underlying pathological cause. I opened the mastoid and found an extensive osteo-sclerosis. The otalgia was banished by the operation and has not returned since.

We see, therefore, that in some cases, indeed in many cases where the diagnosis of hysteria would seem to be natural and inevitable almost at once, it is incumbent upon us to search diligently, conscientiously and repeatedly for any condition either of the ear itself, the nose, the throat or the accessory cavities, that might be able to account for the symptoms complained of, not only for the sake of properly understanding the patient's condition and benefiting the patient, but for the sake of our own reputation.

The management of these cases, whether they be cases of pure hysteria or real aural disease with an element of hysteria is always a delicate matter. Should we make a diagnosis of hysteria in a patient with a normal ear or an ear with but very slight pathological changes I hold that it is our duty to turn the patient over at once to a neurologist, acquainting him with all the facts in our possession—the case is one for a nerve specialist for the patient has no aural disease. In those cases in which there is more or less disease of the ear it becomes a matter of nice discrimination as to how it should be dealt with. Where the hysteria is severe and the aural disease slight I would prefer again to turn the case over to a neurologist and undertake only such treatment of the ear at such times and under such circumstances as in his judgment was best, for we must never forget that continued treatment of the ear will tend to confirm such illusions as the patient may have concerning its condition.

Where, however, the condition of the ear is one calling for immediate attention we must give it that attention—probably in such a case operative, or at least mechanical—bearing in mind the hysterical state of the patient, always speaking cheerfully and, possibly, stretching the facts a little to furnish a favorable prognosis for the disturbed mind. In all events it is imperatively necessary

for us where extensive operative wounds have been inflicted as in an operation for mastoiditis to reduce the discomforts of the period of repair to the minimum and to hasten the process of repair to the utmost. Fortunately modern methods of dressing and handling these cases permit us to do this. All painful packing can be omitted and by proper grafting the area of raw surface is very materially reduced. But throughout all of these procedures we should always bear in mind that in reality we are but doing emergency work on some one else's patient—and this hysterical patient, who has illusions concerning the ear which are beyond the realities which we have recognized, operated upon and healed, should be put in the care of the neurologist at the earliest moment at which we can conscientiously discharge her.

It is certainly unnecessary before a body like this to argue against the propriety of undertaking or pretending to undertake an operation on the ears of these patients for the purpose of attempting to "satisfy their minds." One might characterize this as trivial folly were it not possibly fraught with grave and even serious consequences. I would not mention it were it not that one occasionally sees in the surgical press reference to cases of such unjustifiable childishness. Such a procedure even if alleged to be successful, does not assist in restoring the will power, the mental resistance of the unfortunate patient—on the contrary, it but confirms her in her belief in the reality of the hysterical symptoms under consideration and paves the way for fresh illusions as to the same or other parts of her body for the relief of which she will demand other similarly successful operations. I only mention the matter, gentlemen, for the purpose of expressing an unqualified condemnation.

In every volume of the special journals devoted to the diseases of the ear one can find records of cases of aural hysteria. I have therefore confined my bibliography to a few special cases selected from these journals and to the important and interesting cases that I have found in the leading general journals or in monographs.

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TOOTH CYSTS.*

BY THOS. J. GALLAHER, A.M., M.D., DENVER.

It is not our purpose to transgress upon the domain of the dentist, but rather to report a few cases of interest to the rhinologist.

Tooth cysts may be divided into periosteal and follicular cysts. Periosteal cysts have their origin in the covering of the root, and consist of granulation and epithelial cells. They appear to be more frequent in the upper jaw than the lower, although they are many times overlooked in the lower jaw, owing to the thickness of the bony cortex limiting their growth.

It has been my experience that the lateral incisor and bicuspid are especially affected. The sack gradually increases in size, encroaching upon the surrounding parts, and many times, owing to the bony covering being absorbed, extends into the antrum and nose. It contains a straw-colored fluid, often rich in cholesterin crystals. Not infrequently the contents are infected and a pus sack results.

The treatment of the periosteal cyst is simple and efficient. Incision is made into the cyst wall, thoroughly draining it. If necessary, a counter-opening is made and very mild packing is used for several days, after which time washing of the cyst with antiseptic solutions is all that is required. A cure is usually obtained in from three to six weeks.

The Follicular cysts originate in normal or supernumerary retained tooth germs. They are much slower in growth and not at all dependent upon pathological changes in the tooth itself. The diagnosis is sometimes difficult, but with a swelling in either jaw, together with the absence of the permanent tooth, a Dentigerous cyst should be suspected. The use of the x-ray photograph is especially useful for diagnostic purposes.

The Follicular cysts are the true Dentigerous cysts—that is, tooth-bearing cysts. A root is never developed from these germs, but a tooth crown is often found in the sack.

Treatment of Follicular Cysts.—An incision is made through the mucous membrane and periosteum and a large flap is dissected

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loose. After chiseling away the bony cortex, the inner cystic wall should be most thoroughly dissected out and the mucous membrane of the periosteum crowded into the cavity by a compress. If the sack is not thoroughly removed, there may be a recurrence. Not the least of the dangers of a dentigerous cyst is the possible occurrence of a rarifying osteitis which may destroy the entire jaw.

Case I.—Miss R., age 25, presents herself with marked facial deformity. There is a swelling underneath the upper lip, on each side of the median line, so prominent that the nose is displaced forward. Upon examination, a cyst on each side is easily detected, at the junction of the alveolar and buccal mucous membrane. Examining the nose internally, a cyst is seen along its floor and underneath the anterior portion of the inferior turbinate body. This is a very plain case of double Periosteal cyst connected with the right and left incisor. This is the first case of double Periosteal cyst that I have ever seen. Two incisions were made into the sack, one in the nose and one in the mouth, giving good drainage. This was followed by gentle packing, stimulation with a mild solution of iodine and washing. Both cysts were cured within five weeks. After the operation the cosmetic effect was very striking.

Case II. Mrs. R., age 35, presents herself with a swelling at the right of the median line, causing a displacement of the wing of the nose. It has been coming on for some months and has been painful during the last week. Intranasal examination shows a swelling on the floor of the nose extending to the outer wall. By direct palpation in the nose and under the lip, a cyst is diagnosed. An incision under the lip liberated pus. Another incision was also made on the floor of the nose. The usual treatment was followed out, resulting in a prompt cure.

Case III. Exactly like *Case I*, occurring in a woman, age 40. The sac contained pus and was unilateral.

The above are all illustrations of the ordinary Periosteal cysts.

In conclusion, I wish to report two cases of Follicular or Dentigerous cysts.

Case I. Boy, age 11, presents himself with a swelling in the upper left maxilla which is firm and painful. Immediately above the sixth-year molar a Dentigerous cyst was suspected, and we operated upon him a few days afterward. With a good labial retractor, the parts were well exposed and incision made from the

canine fossa posteriorly to the malar ridge. The membrane and the periosteum were carefully dissected loose, followed by two incisions at right angles to the original one, and the bony cortex removed. The cyst was then dissected out as thoroughly as possible, followed by curettage. The membrane, with its periosteum, was then pushed back into the cavity and held in position by means of tampon. Suppuration followed, but after eight weeks of careful washing and stimulation the entire cavity closed. In this cyst an inverted tooth crown was found, probably a supernumerary bicuspid.

Case II. Young woman, age 22. A diffuse hard swelling is found over the second bicuspid. She reports that she was operated upon previously and the bone scraped. There is a large fistula opening into the antrum. This fistula has discharged for over a year. There has been no discharge of pus from the nose. An incision was made from the median line to the malar ridge. The membrane was then carefully dissected up. In this case it became necessary to remove the entire anterior wall of the antrum. The cyst wall was removed and the extensive removal of bone was made necessary by the existing osteitis. The walls of the antrum were also curetted. The subsequent treatment consisted in the packing and washing of the antrum. A drainage tube was soon introduced and the washing continued through it. Healing was complete in about seven weeks.

No doubt every rhinologist sees many of these cases, but as all of these had been overlooked, I hope that the recital of my experience will be of some interest to you.

605 California Bldg.

ON THE OBLITERATION OF THE ACCESSORY NASAL SINUSES.*

BY A. R. SOLENBERGER, COLORADO SPRINGS.

I shall give a somewhat full report of this case, in order to set forth some points in the technique which have brought success in my hands. I wish the case also to serve as a type of conditions which clearly demand radical measures.

Judge B., age fifty-three, native of Ohio, asthma and bronchitis for seven years, consulted Dr. B. of New York during the fourth year of his disease; diagnosed bilateral ethmoiditis and nasal polypi. The latter were removed by the radical method of ethmoidal exenteration in the old way, by breaking down a few ethmoidal cells with the electro-motor but at intervals of several months,—a method originated by Dr. B. Thus at the end of six months the nasal polypi, together with their bases, were pronounced radically removed.

The patient returned to his home, to find a month later that instead of a diminution of nasal exudate, it had greatly increased.

Dr. H. of Buffalo was now consulted, who diagnosed *bilateral antral disease*. Both antra were now operated upon, through the canine fossae, curetted and treated by packing and irrigation, and the openings allowed to heal at the end of six weeks.

After the interval of some months the nasal discharge had in no way lessened, but rather *increased*, as well as the asthma and bronchitis. Moreover, there appeared a swelling over the *frontal sinuses*. Dr. H. curetted both frontal cavities through a single medial opening, and enlarged the naso-frontal ducts. The openings closed with great difficulty; indeed, in the patient's words, "I had *three* operations on the frontals under general anaesthesia, in *three months*."

There being still no cessation of the nasal discharge, the sphenoid cavities were investigated and found to discharge copious quantities of pus. These cavities were in turn operated upon, by enlargement of their openings and curettment.

The one feature of all these operative measures which seemed of especial significance to the *patient* was the secondary hemorrhage after the sphenoid work.

* Read before the Western Section of the American Laryngological, Rhinological and Otological Society, Denver, Colo., February 16, 1907.

I saw the patient first a little over a year after this last operation. He had sought relief from his affliction in New Mexico and Colorado, hoping now that since all his nasal cavities had been scraped out, the climates, which had helped him before the operation, would now be even more beneficial. He thought his asthma and bronchitis were worse than ever. The quantity of pus from his head alone was over a pint daily. He now had for the first time since the operations again a painful swelling over the frontal sinuses. Meanwhile, too, the patient had been a diligent student of his own condition. He had heard that in Germany they were obliterating the nasal accessory cavities, and that Doctor C. in New York was then doing that operation on a relative of his. He wanted this done on all his cavities. He believed the Colorado climate would contribute to the success of the work. He would give all the time, and everything else that was necessary. He thought his physical condition equal to the radical work.

Of the six cavities, the frontals alone offered slight obstacles to canulization, due to the acute swelling. The patient was very desirous of being relieved of the painful acute frontal condition, to enable him to return east for a month to attend to a business matter involving a vast sum of money. This relief was speedily secured by enlarging the naso-frontal ducts from the inside, and irrigating the cavities. The irrigation was continued by the patient, and he was able to transact his business with a fair degree of comfort, and return to Colorado at the end of two months.

My study of the entire disease circle of this case during the time of treatment of the acute condition of the frontals convinced me that here was a case in which total cavity obliteration was in order.

The Frontal Sinuses. Finding the patient as enthusiastic as ever, we proceeded, under general anaesthesia, as follows: Incision through the median line of the brow, through its entire length, curving well down over the nasal process of the superior maxillary bone, and the removal of the entire anterior wall of the sinus. Every vestige of the overhanging wall was removed, so that the dips on all sides, if not slanting, were at least fairly vertical outward. The contours of both cavities were normal, that is, symmetrical in size, location and outline. Both were lined with pyogenic membrane, rather loosely adherent, the entire cavity filled with suppurating granular tissue, easily spooned out *en masse*. The entire remnant walls were most thoroughly scraped, and irregularities leveled down as much as possible; most searching removal with curved currettes and

burs of all necrotic tissue in the naso-frontal ducts, together with the destruction of one (remnant) ethmoidal cell, near the upper end of the duct. The cavities were then swabbed with carbolic acid and alcohol and packed down to, but not into, the nasal duct. No sutures were taken.

The first two weeks the repackings were done with very little pain, by local anaesthesia. At the end of that time there occurred the expected inveterate inversion of skin edges, in spite of vigorous under-packing—the beginnings of the dreaded deformities. The patient was anaesthetized and a thorough loosening and uplifting of the periosteum around the whole skin circle made a complete under-packing again possible. Meantime the cavities had half filled with a firm, healthy granulating tissue; the naso-frontal ducts were apparently filling in satisfactorily. After this, each week or ten days it became necessary to loosen again and lift up the skin edges, as they tended here and there to invert and prevent underpacking; this was now done under local anaesthesia, sometimes with the needle.

Thus by this periodical loosening and raising and underpacking of the inverting skin flaps, the naso-frontal ducts and the cavities filled up with good tissue, and the edges could be brought together with sutures at the end of the seventh week, and healing by first intention was complete by the eighth week. The flaps were fortunately so managed that when the hair appeared the two brows were on the same level. The only deformity noticeable was the slight depression above and between the nasal bones, occasioned by the previous operations. It is of interest here to note that, from the day of the operation on the frontal cavities, the patient had no more attacks of asthma.

The Sphenoid Cavities. The Sphenoid Cavities were operated on under local anaesthesia, in the sitting position. Cocaine and adrenalin were injected freely into the soft tissue around the enlarged openings, and afterwards powdered cocaine freely applied progressively. Although the openings were enlarged by previous operations, the cavities dipped down nearly two centimeters, which was about the depth of the remnant of the anterior walls. They were too hard and thick to be broken down by any hook or forceps in my possession. The only means at hand seemed to be the electro-motor bur. On the right side I began the work with some trepidation. This was the side where the secondary hemorrhage had occurred after the previous operation. I had meantime secured a reprint of the report which the former operator had given of this case. The hemorrhage had been alarming; the patient had had to suffer a retro-

nasal packing for eight days, and was for a time in a state of collapse from exsanguination.

The operator advanced the opinion that in carrying his excavation toward the right he had exposed the speno-palatine artery, a twig of the internal maxillary.

I, therefore, studiously tried to avoid drilling in that direction. I found that by removing a part of the partition between the two cavities; I could drill the anterior wall down to the floor of the cavity, and get a width of more than a quarter of an inch, through which I could make a very thorough curettment. I feared that by leaving a small part of the outer part of the anterior wall projecting, it would militate against obliteration; but in three weeks the cavity was fairly well filled with tissue, which in a few weeks more became quite firm. The other sinus was then proceeded with in the same manner. The first was filled out at the end of five weeks; the second, being somewhat smaller, filled out in four weeks. There was at no time any hemorrhage of any consequence. The patient had no asthma and only slight bronchitis during the three months of this operative work, and was otherwise in good physical condition.

The Maxillary Antrum. The Maxillary Antra were then opened, through the canine fossae, under general anaesthesia. The antra were found of such size that in order to secure working space to remove the entire anterior walls, especially to get a straight wall outward on the nasal side, the incisions underneath the lip had to be extended upward and inward close to the cartilaginous and osseous border of the nose; and, of course, outward well over the malar process of the maxilla.

Both cavities contained pyogenic membrane of various thickness, and granular tissue, especially on the floors and on the anterior walls apparently at the seat of former operations, and on the nasal wall, beginning at the hiatus, running downward to the floor and forward into the extreme anterior corner, large masses of tough pocketed tissue, all pus producing, was brought into view only after the removal of the extreme upper angle of the outer wall. I was satisfied that this mass had not been removed in the former operation. This mass, as well as the pyogenic tissue around the hiatus, were too firm for the curette. It had to be removed with scissors and punch forceps.

The size of the antra, especially their antero-posterior diameter, being nearly two inches, made it seem a formidable proposition for obliteration, but a fairly good, funnel-shaped outward opening was secured, and a thorough curettment of the nasal openings to en-

courage their closure being made, the after treatment, aiming at a filling up of the cavity from the hiatus downward, was begun; i.e., by packing during the first week, loosely and at times afterward, firmly, to press downward too exuberant granular tissue, for three weeks; after which for a day or two, only now and then the packing was used. No irrigation was used, and the greatest care was taken in the dry cleansing and packing not to destroy the abundant delicate granulations. After the fourth week the dry cleansings were done only on alternate days.

As in the case of the frontal sinuses, the soft tissues around the openings had to be kept back by almost weekly incisions, and lifting of the periosteum (which, however, could always be comfortably done under local anaesthesia).

The opening into the nose in the one cavity closed pretty promptly, and this cavity filled out with much less attention than the other, whose hiatus did not obliterate but formed the inner end of a fistula, closing only in four months after numerous curettings of pus-producing tissue.

It should be said that during the entire time of this obliteration work, the nasal passages, whose linings, as might be supposed, were also at least in a semi-pyogenic state, were constantly under treatment. The winter following this work, the patient for the first time in seven years could remain at his eastern home. No asthma, very little bronchitis, and when last heard from, April 1st, 1906, two years after the last operative work, there was a very small quantity of non-purulent discharge from his nasal passages.

From my experience in obliteration work, I would advance a few considerations in reference to the indications for this radical work, and some points in the technique which I think are essentials to success.

First: In the case of any or all the cavities, the degree of chronicity should be determined as a guide in the choice of methods.

Second: The intra-nasal disease, which is practically always present, should be as nearly as possible eradicated. This in most cases being not possible, the treatment of the nasal passages should go on *pari passu* with the operative work, to guard against re-infection of the operative field.

Third: In all the cavities, too, the entire walls should be removed: no overhanging bones should be allowed; a funnel-shaped outward opening should be aimed at. Curetments should be religiously thorough; bare bone, even though not rough, should be vigorously scraped.

In the case of the frontal cavities, all the necrotic tissue should be scraped or burred out of the naso-frontal ducts, and in any event that canal should be so enlarged that any ethmoidal cells lying along its side, or at the bottom, can be entirely obliterated. The packing should not enter into the duct. This cell obliteration, in several of my cases, left a duct large enough to admit the passage of the little finger into the nose and no trouble was experienced in the subsequent closure of the duct.

The form and location of the frontal cavities also should be taken into account when obliteration is thought of. This, indeed, I think should be the first consideration in the choice of any method of operation for the frontal cavities. Fortunately skiagraphy, in many cases, will show us the height and breadth of cavities, complete and incomplete septa, etc.



At most, only one suture should be taken at the outer angle, and one at the inner angle only when the incision has been carried far forward unto the nose.

I here show a device which is of considerable help in guarding against the inversion of the skin edges. This bridge is well retained and packing through its opening relieves much of the discomfort to the patient. It is made of malleable block tin.

Irrigation should be avoided as much as possible. The dry cleansings with swabs, at most only moist with peroxide if there is purulent matter, should be gently done, that the abundant delicate granulations be not bruised; but even more than in ordinary granulating wounds, one must know when to pack lightly or firmly or not at all, in order to secure the most rapid growth of tissue with plenty of the fibroid element.

Maxillary Sinuses: The Maxillary cavities offer special difficulties in their obliteration, mainly because of the distance of the

nasal openings to the outer edges of the wound, and of the greater tendency to proliferation of the soft tissues around the external opening. Nature seems here to be especially rebellious against the obliterative aims of the surgeon.

The first condition for success here is the early closure of the hiatus semilunaris. To effect a closure of this opening is to work squarely against every law of nature which intends that this cavity should breathe through the nose and drain through the nose. Of course the same can be said of other sinuses, but when an attempt is made to heal the antrum through the canine fossae, a vast difference is experienced.

Other operators, too, have met with but indifferent success in obliterating these cavities. Among them Coakley, who has had perhaps the largest experience in this country, reports cases which still had fistulae a year after the operation.

For this reason I think obliteration of the maxillary cavities will in the future be more and more done by making vents and draining through nature's avenues; that is, by the Campbell-Luc method—the removal of the nasal wall and the encouragement of the filling up process. Indeed, by this method I have myself seen these cavities fill up with firm fibroid tissue, so that there was left only a shallow sulcus in the nasal fossae, and secretions that gathered there could be dislodged by ordinary blowing of the nose.

INDICATIONS FOR OBLITERATION OF THE SINUSES.

To in any way exhaustively study the indications for sinus obliteration, though perhaps the most profitable study of all, would not be possible at this time. I would therefore consider the indications only in a general way.

First, in regard to all the cavities. As in all surgical work in which the method aims at the obliteration of a *structure*, not to say an *organ*, the *more radical* such *procedure* the *finer* should be the *discrimination* and the more deliberate the *judgment* in regard to the *indication*.

In general it may be said that the method is justified only in the highly chronic conditions, in multiple sinusitis; especially such as have had previous unsuccessful operations.

Second, in the case of the frontal cavities, the form and location should be taken into account when obliteration is thought of. This, indeed, should be the first consideration in the choice of any method of operation upon the frontal cavities. Fortunately skiagraphy, in many cases, will show us the height and breadth of the cavities,

complete and incomplete septa. It will show certain forms of cavities that by *any method* which aims at *obliteration*, will cause such a deformity that may be considered by the *patient* a very extreme price to pay for his relief.

Third. Though we should be very tardy in discrediting a master in rhinological work, Sir Felix Semon, who recently, in a discussion of this subject, advocated extreme *conservatism* in *any radical* work upon the accessory cavities, giving for his reason that he has seen no cases *coming to grief*, we all know that we are derelict in our work if we do not act in the radical way, to permanently relieve certain conditions, which if they do not threaten life at least make life not worth living. Obviously it depends upon what constitutes the condition which Sir Felix calls "grief." Usually in all cases of multiple sinusitis, or even in many cases of chronic *frontal* sinusitis, there is a mental state present which ranges all the way from a depression which incapacitates the patient to states bordering upon suicide.

Aside from these serious conditions, we must all agree that reservoirs of pus whose geographical position are such as to constitute a prolific causal factor in the production of the numerous respiratory diseases make the obliteration not only desirable but obligatory. How frequently do we not find disease of the lungs only a segment in the disease circle running through the cavities of the head which are in a state of chronic suppuration? How futile and often impossible is the application of remedial measures to diseased cavities in the lower respiratory tract while chronic inflammatory and often infectious exudates from the upper cavities drain down upon them!

In this respect it will be plainly seen that the frontal cavities are the greater sinners; and as a matter of fact, of all the accessory sinuses the obliteration of the latter is the most frequently indicated. The fact that the maxillary sinuses are the most frequently found diseased is no doubt due to their location relative to the frontal sinuses and anterior ethmoid cells—their funnel-shaped openings invite the dumpings from these upper cavities and convert them into receptacles for these dumpings.

In regard to the destruction of any function that these cavities may have, it may be perhaps sufficient to say that we must choose between the least of two evils.

Fourth. After ruling out elderly people and people who have other serious diseases, as of the heart, kidney and lungs, we may, I think, say that all other cases which have had effective intra-nasal

treatment, without cure, if they desire to be permanently rid of their diseased cavities, must submit to the obliterative work.

In answer to a query recently put to Coakley, he says:

"I firmly believe that obliteration of the accessory sinuses is the only sure and permanent cure for chronic suppurative sinusitis. The method by which this is to be accomplished must vary considerably with individual cases. While I have been exceedingly successful with the methods advocated in the aforesaid reprint,* wider experience has led me to believe that in some cases other methods of treatment accomplish the same result with less discomfort to the patient."

I think we can all agree with Dr. Coakley's general statement; but in it we no doubt all see an opportunity and the necessity for fine discrimination as to just what class of cases comes under the head of the "some cases" referred to in his modifying statement. I would more especially make it apply to those of the maxillary sinuses—in which other methods "will produce the same results with less discomfort to the patient"*

Fifth. There are numerous other considerations, for the most part such as affect the patient.

In general, the whole patient must enter into the problem. The *man* must be considered. It is obvious that he must be rather extraordinarily qualified, at least in three respects: 1st: Morally, he must have more than ordinary patience and faith in the operator. 2nd: Intellectually, he should have a more than ordinary understanding of the condition, procedure and result expected in order to insure that patience. 3rd: Physically more than ordinary endurance. And a 4th qualification might be added, financially. As human nature and conditions are constituted, this may make for or against the success.

Sixth. Again, it is not always possible to take in every factor that will determine the method of procedure until the cavities are actually opened and explored.

Not to prolong this presentation, I would refer the fellows to Dr. Coakley's exhaustive resumé, for further conditions that call for the open operative method, in his admirable paper on "Frontal Sinusitis; Diagnosis and Treatment."

106 East St. Vrain Court.

* COAKLEY: Frontal Sinusitis: Diagnosis and Treatment.

CONCERNING THE RADICAL TREATMENT OF CHRONIC DISEASES OF THE ANTRUM WITH SUGGESTIONS FOR A NEW METHOD IN OPERATING BY THE SUBMUCOUS RESECTION OF THE LATERAL NASAL WALL.*

R. BISHOP CANFIELD, M. D., ANN ARBOR, MICH.

The chief objection to the generally accepted radical operative procedure for the relief of chronic disease of the maxillary antrum, i. e., the Luc-Caldwell operation, to my mind has been that it offered no opportunity for visual control of the operative field during the after treatment. To review briefly the steps in this operation, it consists in:

1. A mucous membrane incision above the alveolar margin and retraction of the mucous membrane and periosteum.
2. The removal of the anterior antral wall.
3. More or less complete curettage of the lining membrane of the antrum.
4. Formation of a counter opening into the nose, by removal of a part of the lateral wall of the nose.
5. Formation of a mucous membrane flap from a part of the lateral wall of the nose to insure permanence of the opening into the nose.
6. Suturing of this flap in place to the floor of the antrum.
7. Packing the antrum with gauze, the ends of which extend into the nostril.
8. Suturing the initial incision for primary union.

Five to eight days later, the gauze is removed through the nostril and the after treatment is carried out through the nose by means of irrigation, insufflations, etc. By this method many cases pass through a brief convalescence to a satisfactory termination. Many however, fail of a complete cure. Failure has been ascribed to many causes, such as:

1. Great size of the antrum.
2. Essentially chronic character of the disease process.
3. Marked degree or character of the pathological change.

* Read at the Annual Meeting of the Middle Section of the American Laryngological, Rhinological and Otological Society, Cleveland, February 22, 1907.

4. The extent of the pathological process which may have involved all or nearly all the other accessory cavities.

In many cases failure has been due, without question, to one or all of these causes. It has seemed to me, however, that if a satisfactory and thorough operation has been performed, and all or nearly all of the disease eradicated, cure should result in cases where failure has been recorded.

Opportunity has been afforded me to reopen antra that have been operated upon radically by the above method, and I have found in some of them irregularities in the healing process which, although sometimes distinctively reparative in their nature, have been instrumental in prolonging convalescence or even making a cure impossible, in some places exuberent and purulent granulations or infected epidermis, in others depressions in a thickened mucous membrane which contain pus. Occasionally there are seen bands of adhesions that more or less completely wall off sections of the antrum and divide it into chambers, one of which may be healing, while others contain pus.

Until recently, the only method by which the antral cavity could be kept under observation after operation was by leaving the initial incision open and carrying out the after treatment through the canine fossa until healing had progressed to such a point that the initial incision might safely be sutured and treatment carried out through the nose. Many objections have been raised to such a procedure:

1. The after treatment is painful.
2. The wound must be kept packed.
3. The patient's saliva is kept saturated with iodoform.
4. Reinfection from the mouth secretions continually takes place.
5. Deformity of the cheek sometimes occurs.
6. Subjective sensations of pain, cold and discomfort frequently persist as long as the opening is allowed to remain.

Friedrich, in 1905, was the first to depart from the accepted method by making a skin incision around the ala. Through this incision he removed the anterior antral wall, the lateral wall of the nose and the lateral wall of the pyriform opening together with the anterior half of the inferior turbinate. He then packed the antrum with gauze and allowed the ends to extend into the nostril in the

usual way. The skin incision was then sutured for primary union. Of course objections to this method of operating are readily seen. It offers danger of scar and of wound infection and increases the gravity of the operation.

Kretschman made the second advance by doing the ordinary Luc-Caldwell operation through the usual alveolar incision, and in addition removing the lateral wall of the nose as far as the lateral wall of the pyriform opening. This he left standing for fear of deformity. By this method he hoped to secure some view of the antrum throughout the convalescence, but as one can readily demonstrate by doing the operation, he failed.

Later Denker made a decided advance by doing the Luc-Caldwell and in addition removing the lateral wall of the nose, including the lateral wall of the pyriform opening. The flap was cut in the usual way and the antrum packed. The initial incision was sutured. This operation converts the nose and antrum roughly into one cavity, of which a fairly comprehensive view can be secured through the nose. He reports three cases, in the first of which he was not successful on account of the presence of a complication involving the frontal sinus. The patient was, however, much improved. In the other two cases, the patients were very greatly benefited, the only remains of the trouble being a trace of moisture upon washing.

I have operated seven cases somewhat after this method. In the first three, I followed it as closely as might be. In the last four, I varied it as follows:

1. Incision through the alveolar mucous membrane to the median line.
2. Retraction of the soft parts.
3. Removal of the lateral wall of the pyriform opening and the lateral wall of the nose backwards for about two-thirds of the distance of the attachment of the inferior turbinate, and upwards from the floor of the nose to and including the attachment of the inferior turbinate.
4. Removal of as much of the anterior wall of the antrum as seems necessary.
5. Formation of the mucous membrane flap which is turned down into antrum.
6. Packing the antrum with gauze, the ends of which extend into nostril.
7. Suturing of initial incision for primary union.

Such an operation should be preceded about two weeks by a preliminary amputation of the anterior half of the inferior turbinate. The technique offers a few difficulties not encountered in the Luc-Caldwell, chief of which is the thorough removal of the nasal wall along the attachment of the inferior turbinate. It presents several advantages:

1. It offers a satisfactory view of the antrum through the nose during the after treatment.

2. It permits careful observation and control of the healing process.

3. It can be made as radical as necessary by removing the entire anterior wall and entering the ethmoid and sphenoid, or it can be made a comparatively conservative operation by removing less of the anterior wall of the antrum and the lateral wall of the nose if, at the time of operation, closer examination of the condition renders the more extensive operation unnecessary.

4. The after treatment is painless.

5. The greater part of the after treatment can easily be carried out by the patient.

I wish briefly to report the following seven cases:

CASE 1. Mrs. D., 40 years. Came to hospital on account of antrum disease which began five years ago during an attack of grip, with pain and swelling of the side of the face. Pain was much worse in the morning. During the afternoon profuse discharge would appear in the nostril. Pain lasted for about five weeks, but discharge persisted. At this time, a healthy first molar was extracted in order to establish communication between the mouth and the antrum. A slender gold tube was inserted and held in place by means of a silk thread fastened to an adjoining tooth. This tube she has worn ever since. She has had occasional exacerbations of the trouble. Five days ago she lost the tube in the antrum. Transillumination positive.

Examination. Nose right strings of pus throughout the nose and the post nasal space. Polypoid degeneration of the anterior end of the middle turbinate. Mouth in fairly good condition. Culture from antrum shows streptococcus. X-Ray discovers the foreign body in antrum.

March 14, 1906. R. Radical antrum operation; ether 1½ hours. Antrum of great size filled with stinking pus. Mucous membrane shows marked polypoid degeneration. Curettage of entire cavity. Removal of greater part of the anterior antral wall and of the lateral wall of the nose, including that of the pyriform opening in its

lower half. Foreign body recovered. Sinus through tooth socket closed.

March 18. Gauze and stitches removed. Slight amount of pus.

March 31. Patient discharged. Antrum dry. Given tube for necessary irrigation.

May 31. Returned for control. Antrum dry. Practically no discharge since leaving hospital.

CASE 2. Damsma, laborer, 29 years, Kalamazoo, Mich. Comes to hospital on account of discharge of pus through socket of an extracted tooth. This discharge has persisted since the tooth was removed a couple of years ago.

Examination. Moderate hypertrophy of inferior turbinate. Some oedema of middle turbinate. Pus in middle meatus and generally throughout the nose. Sinus leads upwards through the socket of the left first molar tooth. Pus appears through this sinus.

March 2. Anterior half of left inferior turbinate removed.

March 16. Culture from antrum shows streptococcus.

March 16. Radical antrum operation, left. Ether, 1½ hours. The radical operation was performed with removal of the lower half of the bony wall of the pyriform opening. Antrum enormous and contains fair amount of muco pus. Lining membrane shows marked hypertrophy with some polypoid degeneration. It was thoroughly curetted. Usual mucous membrane flap, antrum packed with gauze and initial incision sutured. Sinus through tooth cavity curetted.

March 21. Gauze removed. Slight amount of pus.

April 10. Patient given a Halle canula and allowed to carry out daily irrigation. Occasional observation of antrum through nose with applications to healing surface.

May 11. Finger passed through nose into antrum shows everywhere lining membrane perfectly smooth. Antrum is apparently perfectly healed, although as every effort to close the sinus through the tooth cavity has been unsuccessful there still remains some secretion which reaches antrum from mouth.

CASE 3. Mrs. M. Denver, 36 years. Two years ago during an attack of grip contracted an attack of acute disease of the left antrum. Condition was allowed to become chronic. A year ago first upper molar was extracted, communication established between antrum and nose and a gold tube inserted. This tube she has worn ever since. She has continual discharge with some pain and swelling of cheek and eyelid despite daily irrigation.

Examination. Moderate oedema of anterior end of middle turbinate. Small amount of pus on posterior end of inferior turbinate. Probe passed through sinus in tooth cavity reveals thickened mucous membrane, with granulations high up and far back. Transil-

lumination positive. X-ray shows slight diffuse haze over entire antral region.

May 13, 1906. Radical antrum operation. Ether, 1¾ hours. Mucous membrane of antrum shows marked polypoid degeneration about upper end of sinus. Far back beneath orbit were several polyps and some pus. Antrum and ethmoid thoroughly curetted. Lateral wall of nose together with part of bony wall of the pyriform opening removed in the usual way. Usual flap, packing and suture of initial incision. Sinus through tooth curetted.

May 18. Gauze removed.

June 10. Under daily observation through nose, antrum has healed. For several days has been no pus.

June 23. Remains dry.

CASE 4. Acker, laborer, 31 years, Raber, Mich. Comes to hospital on account of discharge from right nostril which has persisted for four years without other symptoms. Four years ago contracted syphilis, which has been thoroughly treated without appreciable effect on the antral condition.

Examination. Considerable oedema of entire nasal mucous membrane. Marked oedema of both inferior and middle turbinates. Right side shows middle meatus filled with crusts and pus. Nasopharynx also contains considerable amount of pus and dry secretion. Transillumination positive. X-Ray indefinite.

April 24, 1906. Radical antrum operation, right. Ether, 1½ hours. Operation performed in usual way with resection of anterior antral wall, lateral nasal wall and bony wall of pyriform opening. Flap formation, packing and suture. Antrum was found to contain small amount of pus having a somewhat foul odor. Median wall of antrum was dark, soft and rather sugary, evidently carious. Thorough curettage of antral lining and of ethmoid.

May 29. Gauze removed.

May 10. Developed metastatic thrombo-phlebitis.

May 30. Antrum dry. Considerable secretion in nose in the neighborhood of the ethmoid. Patient disappeared.

June 15. Antrum dry. Small amount of secretion in ethmoid. Patient disappeared.

July 15. Patient reappeared. Antral mucous membrane smooth and cavity apparently dry. Some flakes of secretion appear on washing.

CASE 5. Miss H. Nurse. Has had discharge from left nostril with occasional pain in left cheek since attack of grippe about two years ago. At times there is some odor in nostril.

Examination. Hypertrophy of both inferior turbinates. Fair amount of pus in left nostril and in nasopharynx.

Transillumination positive. X-Ray questionable.

August 9, 1906. Left radical antrum operation. Ether, 1¼ hours. Operation in the usual way with resection of anterior antral wall, lateral wall of nose and lateral wall of pyriform opening, packing, flap and suture. Antrum contained much creamy pus, mucous membrane showed considerable thickening.

August 17. Gauze removed.

August 30. Patient has had daily irrigation with occasional application of silver nitrate solution, 10 gr. to the ounce. Slight discharge.

October 1. Antrum has been dry for some time.

CASE 6. Mrs. F. Trouble began four years ago with headache, soreness, sense of tension in head and in right cheek. No swelling or discharge until opening was made through socket of first molar tooth which tooth was extracted for the purpose. Since then has had continual discharge through tooth cavity with frequent swelling and pain in cheek and lower eye lid. Two years ago had a nose operation on the right side.

Examination. Right. Anterior end of middle turbinate gone. No pus in nose. Marked hypertrophy of inferior turbinate. Sinus leads up through socket of first molar tooth. Irrigation through sinus allows pus to escape through nose. Patient complains of considerable pain in region of antrum and above right eye, which persists almost without intermission. Transillumination positive for antrum and frontal sinus.

December 4, 1906. Radical antrum operation. Ether 1½ hours. Operation in the usual way with resection of anterior antral wall, lateral wall of nose and pyriform opening. The antrum was found filled with pus and thickened membrane to such an extent that cavity was almost obliterated. Cavity thoroughly curetted, ethmoid entered, found filled with infiltrated membrane and obliterated. Usual flap, packing and suture. Tooth sinus curetted.

December 7. Gauze removed, free escape of pus. Satisfactory view of antrum secured through nose.

December 20. Daily treatment, pus in slight amount from antrum, but in considerable amount from frontal sinus.

January 15. Antrum apparently almost healed. Still considerable pus from frontal with pain and headache. Killian operation advised.

February 10. Apparently very slight amount of pus in antrum which seems to be lined with a smooth membrane. Still pus from frontal.

June 20. Antrum healed. Has been dry two months. Some pus from frontal.

CASE 7. Mr. J., dental student, 28 years. Has had discharge from antrum for about three years. In the beginning, it was supposed to come from a diseased first molar, so the tooth was removed and communication established through its socket between antrum

and mouth. Since then continual discharge from mouth and from nose.

Examination. Nose negative except for small amount of pus on nasal floor. Sinus through second molar through which pus appears. Probe passes up into a small antrum and discovers soft granulations. Two weeks treatment was quite without result.

January 14, 1907. Radical antrum operation, left. Ether, 1 hour. Usual operation with resection of lateral wall of pyriform opening, lateral wall of nose and part of anterior wall of antrum. Antrum found to be very narrow, but fairly deep. It contained pus and degenerated lining membrane considerably thickened and degenerated. Ethmoid was entered, found involved and curetted. Usual flap, packing and suture.

January 18. Gauze removed.

February 18. Very slight amount of secretion in antrum when washed. Ethmoid area shows some crusts and secretion.

May 1. Dry.

In looking over this short series of cases I feel that the results are more satisfactory than those secured by the Luc-Caldwell operation. After the latter operation the subsequent treatment must be carried on largely in the dark, and the condition of the antrum inferred from the amount of discharge and the severity of the symptoms. After the operation just described treatment can be carried out under visual control, the healing process watched with ease and the final result looked forward to with some degree of certainty.

The above operation then offers a fairly satisfactory way of dealing with chronic antral disease, either simple or combined. It has seemed to me, however, that an operation that would afford free access to all the accessory sinuses without an incision through the buccal mucosa would offer many advantages. My last case, therefore, I have operated upon entirely through the nose by a sub-mucous resection of the lateral wall of the nose, as follows:

1. Preliminary amputation of the anterior half of the inferior turbinate two weeks, if possible, before the antrum operation.

2. Infiltration anesthesia with $\frac{1}{4}\%$ cocain in 1-5000 adrenalin injected along the lateral wall of the nose and the anterior wall of the antrum.

3. An incision through the soft parts of the nostril at the junction of the skin and mucous membrane, beginning about the middle of the lateral wall of the pyriform opening and carried well down to the floor of the nose. This incision passes through the periosteum to the bone and corresponds exactly to the lateral wall of the pyriform opening.

4. Elevation of the mucous membrane and periosteum of the lateral wall of the nose from the floor of the nose to the level of the insertion of the inferior turbinate and backwards as far as the inferior turbinate has been amputated.

5. Elevation of the periosteum of the anterior antral wall for any desired distance.

6. Removal of the inferior half of the lateral wall of the pyriform opening and the lateral wall of the nose over an area corresponding to that part from which the mucous membrane has been elevated.

7. Removal of the desired amount of the anterior antral wall, i. e., enough to allow view of antrum.

8. Penetration of the lining membrane of the antrum and inspection of the cavity.

9. As thorough curettage of the antrum as necessary.

10. Curettage of the ethmoid and entrance of the sphenoid if indicated.

11. Formation of a flap of the mucous membrane of the lateral wall of the nose with base downwards.

12. Application of this flap to the floor of the antrum and packing with gauze.

There seems to me to be several advantages in this operation.

1. It can be performed under local anaesthesia.

2. It offers a most satisfactory view of the antrum and maintains it throughout the after treatment.

3. It can be made just as radical or just as conservative as may seem wise as the operation proceeds.

4. It offers the most direct and adequate approach to the ethmoid and sphenoid.

5. It necessitates no buccal incision.

6. It requires no suture.

7. It simplifies the after treatment greatly.

8. It accomplishes all that any other operation can in similar condition.

The difficulties of the operation are mainly those encountered in the sub-mucous resection of the nasal septum, increased somewhat by the fact that the lateral wall of the nose is sharply concave and that the bone of the lateral wall of the pyriform opening is

very dense and requires the energetic use of the mallet and chisel or a strong rongeur.

I wish to report the following case:

Mr. S., 23 years, Jackson, Mich. Came to hospital on account of a discharge from the left nostril, which has persisted for some years. Early in the course of the disease the first molar was extracted and communication was established between the antrum and mouth. Through this opening the antrum has been irrigated daily every since without improvement.

Examination. Moderate spur. Left nostril contains pus. Considerable hypertrophy of both inferior and middle turbinate. Probe passes through sinus in the socket of the previously extracted tooth into antrum. Mucous membrane of antrum as felt by probe seems to be soft and velvety. Pus follows the probe.

Operation by the above method allowed free view of antrum, which contained much pus, granulation tissue with some polypoid degeneration. Ethnoids were easily accessible, were found filled with thickened mucous membrane and some pus and were curetted. The flap formed of the lateral wall of the nose was torn so that about half of it was lost. The remainder was turned down over the floor of the antrum, which was then packed with gauze.

I was much pleased with the operation on account of the ease with which the antrum was opened and examined. Almost the entire antrum could be satisfactorily seen. Even far back under the orbit, a region always somewhat hard to see, was clearly visible. With the anterior half of the inferior turbinate and corresponding part of the lateral wall of the nose out of the way the ethmoid was thoroughly accessible and was curetted with more satisfaction than I had ever experienced before when attacking it from below.

(Since reading this paper other operations have been *performed* according to the last mentioned method with satisfactory results.)

COMPLETE REMOVAL OF FAUCIAL TONSILS.*

BY OVIDUS ARTHUR GRIFFIN, B. S., M. D., ANN ARBOR, MICH.

Aside from a broader knowledge of detail that results from a repetition of facts, it would be superfluous on this occasion to give an extended discussion of this subject, but inasmuch as unanimity of opinion does not obtain throughout the profession as to the proper method of treatment of diseased faucial tonsils and the best mode of their removal, and being desirous of presenting a method which has proven satisfactory in my practice, I beg to direct your attention to the following facts:

Owing to their intermediate position between the mouth and pharynx and their glandular structure, the faucial tonsils frequently become infected and chronically diseased by the passage of food or foreign matter into the ramifying glandular ducts which open upon their exposed surface, and after a time, their function of pharyngeal lubrication becomes so perverted that the ducts and glands finally become distended and indurated by the retention of a caseated secretion, composed mostly of desquamated epithelium, leucocytes, and micro-organisms. The resulting ptomains of decomposition permeate the surrounding lymphatic system, leading to chronic inflammation of adjacent pharyngeal structures and often evidencing its systemic effect by the production of rheumatic symptoms.

Under these circumstances, it would seem that only one method of treatment would be considered, but a perusal of many books upon the subject indicates that palliative measures in the form of gargles, sprays, and applications to the distended ducts constitutes the rational course of treatment. If there be a broad and devious path that leads to disappointment, both to the patient and attending physician, the above procedure which attacks the disease only superficially or a partial removal of the tonsils certainly points the way. On the contrary, however, a total extirpation of the offending tonsillar tissue offers naught but an ultimate cessation of both local and systematic derangements, and no one more fully appreciates this fact that the writer, who was compelled to undergo an operation by three different laryngologists before his tonsils were completely removed and a train of distressing symptoms permanently relieved.

* Read before the Eleventh Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology, St. Clair, Mich., August 30, 31 and September 1, 1906.

In common with the experience of fellow laryngologists, I realized that with the armamentarium which obtained until a few years ago it was impossible to effect a complete operation, until an instrument was devised whereby the adherent pillars could be separated from the tonsillar tissue, preliminary to its removal, especially when the tonsils were submerged. Thus it was, and still obtains in the practice of the unskilled, that a majority of the amputated cases had a "recurrence" of tonsils or as the laity put it, "the tonsils grew in again," while the unfortunate sufferer experienced little or no improvement in his condition. To the informed, however, it is evident that the faucial tonsils do not recur after complete removal, and that the return of former symptoms is due to a retention of some of the originally diseased tissue. How often in advising a removal of tonsils for the correction of a pharyngeal or aural disorder have I witnessed that expression of mingled sur-

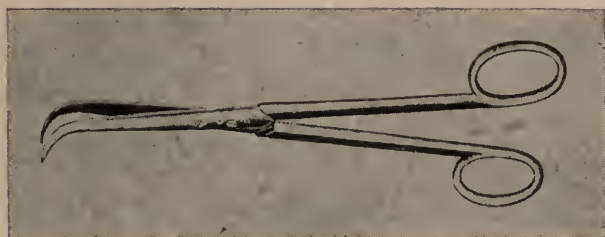


Fig. 1. Author's Tonsil Scissors.

prise and disgust as the unfortunate patient replied: "Why, I had my tonsils removed by Dr. Blank and he charged me ten dollars!" Thus it was, prior to a few years past, that the operation was regarded by both the laity and general practitioner as a simple procedure which anyone could perform, but with improved instrumentation and details of technique, the complete removal of tonsils is now justly regarded as a serious and exacting operation which demands as much dexterity and skill as any major operation to secure proper results, and the compensation should be accordingly remunerative.

Realizing the limitations of the knife, tonsillotome, and snare, several years ago, I devised a scissor whereby the pillars could be severed from the tonsils, but even then I could not in all cases completely remove the base of submerged tonsils or the tissue which obliterated the supratonsillar space between the anterior and pos-

terior pillars, until I finally produced the present form of scissor which is herewith illustrated. By means of this device, the complete operation of separating the adherent pillars and removing the entire tonsil, either right or left, can be effected by the use of a single cutting instrument as shown in following cuts:

In the following illustration (Fig. 2) is pictured a characteristic throat in which the left tonsil is hypertrophied and the ducts distended, while on the other side is located the remains of an unskillful operation or the tonsil may represent a submerged variety. It will be observed that the edges of the anterior pillars are darkened (reddened), showing that a chronic form of inflammation exists behind them whereby the pillars become adherent to the tonsillar tissue.

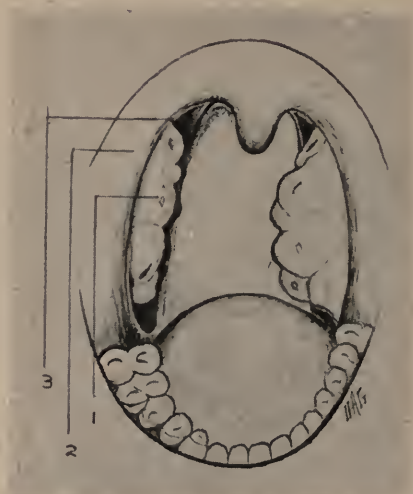


Fig. 2. Hypertrophied Left Tonsil. Submerged Right Tonsil.

With lightning rapidity, the artist has effected a complete removal of the right tonsil as evidenced by the deep, empty tonsillar fossa which is more readily shown by a retraction of the anterior pillar (Fig. 3), and in the following cuts, the details of the procedure are fully illustrated. When traction is applied to an adherent or submerged tonsil, the attached pillars are also drawn toward the median line so that the base of tonsil cannot be reached until the pillars are severed from the tonsillar tissue. In Fig. 3, the anterior pillar is being separated by means of the scissor, although a curved knife may also be employed, but dense tissue can-

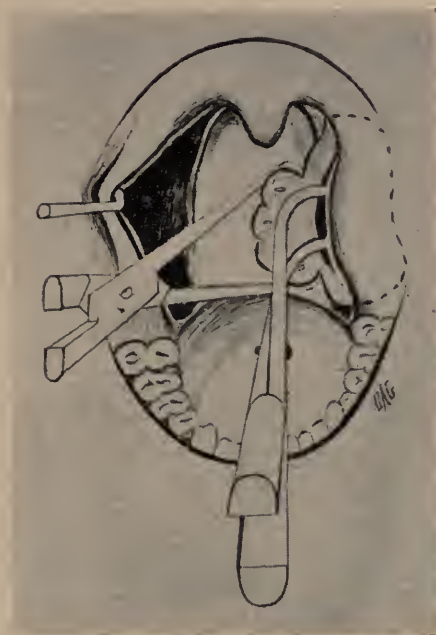


Fig. 3. Right Tonsil Removed, Separating Left Anterior Pillar.

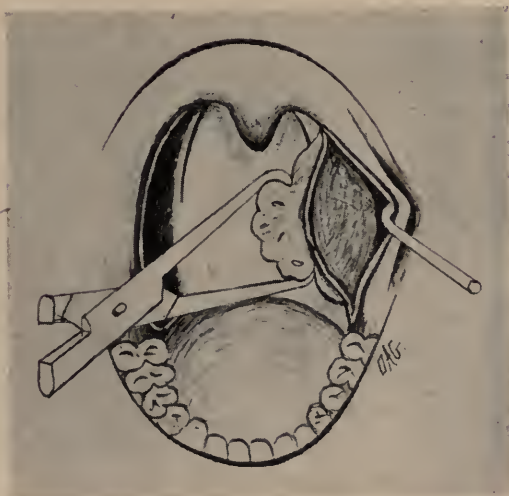


Fig. 4. Anterior Pillar Separated and Retracted.

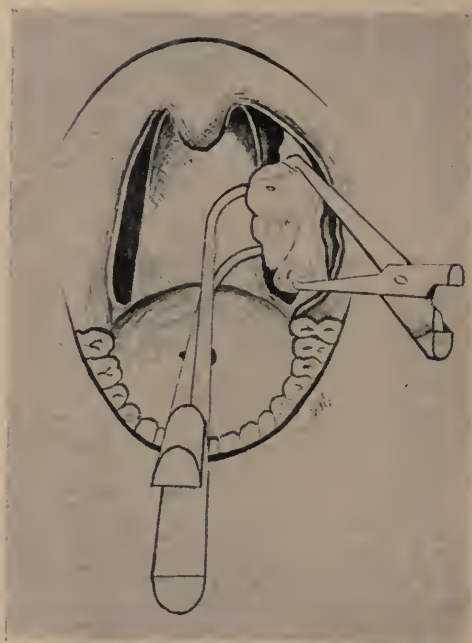


Fig. 5. Separating Posterior Pillar.

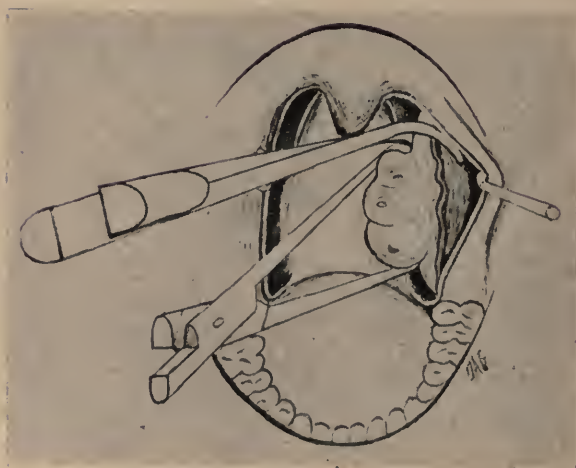


Fig. 6. Removing Left Tonsil.

not be as effectually cut by a knife. The dotted line indicates position of base of tonsil to which point the pillar must be loosened.

After the anterior pillar is separated, the traction forceps are changed so that the tonsil is drawn forward and outward when the posterior pillar is easily severed as shown in Fig. 5.

After both anterior and posterior pillars are separated, as illustrated in Fig. 6, the opposite angle of mouth is retracted by an assistant and the tonsil is strongly drawn from its fossa toward the median line, while the scissors are introduced into the supratonsillar space and pushed in deeply so as to reach the base of tonsil before beginning to cut. In this manner, the cavity will be left smooth and clean. The incision is continued downward until the whole base is separated. In some instances, matters may be facilitated by reversing the scissors and cutting upward from the bottom after the supratonsillar attachment is separated or they may be introduced from the front and the pillars pushed away by the flat surface of the scissors while the curved portion is forced deeply into the tonsillar fossa to reach the base of tonsil and complete the operation. In many cases owing to gagging movements of the patient, it may be necessary to remove the tonsil in several pieces, but in favorable instances, the whole mass can be separated at once.

In regard to the occurrence of hemorrhage, it has been my experience that the bleeding from a complete removal of the tonsils is not more profuse than when a partial extirpation is effected, inasmuch as the remaining soft tissues are favorable to a prompt contraction and retraction of the severed blood vessels, while an indurated mass which often remains after a partial removal tends to prevent a closure of the vessels and thus favors prolonged hemorrhage.

While my scissors were devised primarily as a tonsil instrument, I have found them admirably adapted for enucleation of the eye, eviceration of the orbit, and separating adhesions of the palate or uvula to the pharynx.

The scissors are made by F. A. Hardy & Co., Chicago, and H. Pfau, Berlin, Germany.

340 S. State Street.

TUBERCULAR INFECTIONS OF THE FAUCIAL TONSIL.*

BY CHARLES M. ROBERTSON, M. D., CHICAGO.

Tubercular infection of the tonsil is of frequent enough occurrence in this locality to command especial attention, as shown in the research of the author. In my report it was found that 8% of patients presenting for nose and throat symptoms, exhibited primary tuberculosis of the faucial tonsil. It was further found that a large number of these patients exhibited lung tuberculosis as a direct infection from this gland through the lymphatic chains.

The tonsil may become tuberculous in one of three ways.

1. By infection from the presence of tubercular material in or about the tonsil from inoculation by the air, or from food introduced into the mouth coming in contact with the tonsillar gland.

2. From inoculation by sputum coughed up from a tubercular lung producing an inoculation on the surface membrane of the tonsil.

3. From infection by the blood through lymphatics.

The first is a primary and the second and third are secondary infections. The first interests us most, for with proper means, we can avoid the occurrence of the disease by ablation of the gland.

If we inoculate the tonsil with strong tubercular cultures we are able to produce this infection of the gland. We are aware that it is harder for an inoculation to take place on the surface membrane of the gland than in the crypt because of the thickness of the covering of the tonsil by squamous epithelium. The lining membrane of the crypts is much thinner and we have therefore a more favorable site for the infection to take place. This is borne out by observation.

In caseous tonsils we have crypts filled with cheesy material composed of epithelial cells and mixed substance containing numerous varieties of bacteria. The crypts most constant in filling with such material are those which have some obstruction to the opening. These we find in the upper part of the gland, or in the supra-tonsillar fossa. This occurs constantly or at intervals and the crypt being filled with material is squeezed between the anterior and posterior pillars and the superior constrictor muscle of the pharynx at each act of swallowing.

If the opening of the crypt is occluded or pressed upon, the material is pushed deeper into the crypt or out into the supra-tonsillar space along the line of least resistance. In this way the crypt extends deeper and becomes larger in size, so it is common to find them extending to the extreme periphery of the gland as far as the capsule.

* Read before the Joint Meeting of the Chicago Medical Society and the Chicago Laryngological Society, March 21, 1907.

Here this material lies and decomposes forming an auto-infection which occurs most frequently in the depth of the crypt.

The lymph bodies then take up the tubercular infection. In examining hundreds of tonsil specimens, it was found that solitary lymph bodies broke down with epithelioid degeneration and showed the presence of tubercular giant cells. The infection is taken up readily by the lymphatic glands as was shown by tubercular infection of the cervical lymphatics before the infection in the tonsil had affected more than two or three lymph bodies surrounding a crypt. The tubercular change was never found to extend from one crypt to another. The lymphatic nodes infected from a crypt was limited to one trabecular area.

Infections other than tubercle are found, as was demonstrated by the gentlemen proceeding me, and there is no rule by which the virulency of the infection can be gauged. Thus we may have an infection occurring over a long period of time, the lymphatics passing the infection to the blood without much enlargement of the lymphatics. On the other hand we may have an infection coming on suddenly and in greater quantity which may produce a large amount of swelling of the lymphatics and still not much of the infection reach the general system. This is brought about by the destructive properties of the lymphatics to infective material. Often the infection thus introduced is explosive but not serious, being of a less dangerous bacteria. In these cases the lymphatics in the neck become large but disappear after the infecting bacteria are destroyed by phagocytosis in the glands affected.

The scope of this paper was not to extend beyond the tonsil itself; and, in order to show the process of infection of the gland, it is necessary to consider the process of entrance of infection first into the crypt and then from the crypt into the tissue surrounding the same.

That we may understand the tonsil let me invite your attention to a few points as to the anatomy of the part. The tonsil, as we know, is a lymphatic gland lying in the tonsillar fossa. It does not usually occupy the entire space, there being a fossa above the tonsil called the supra-tonsillar space. This supra-tonsillar space varies in size according to the size of the gland. It is usually found as a conical or triangular cavity with the apex outward. It is bounded in front by the anterior pillar, behind by the posterior pillar, above by the junction of the two pillars, while the floor is formed by the top of the tonsil. Into this space empty the superior crypts of the tonsil. They vary in number; but four crypts are almost constant. They empty their contents into the supra-tonsillar fossa which communicates with

the pharynx. Very often the edge of the anterior pillar, which in foetal life extends backward more or less completely covering the tonsil, is persistent and when so, is known as the plica tonsillaris. This membrane varies greatly in its extent and likewise in its consistence. At times it is thin and web-like, while at other times it is a tough and thickened membrane which may or may not be attached to the gland itself or to the posterior pillar behind. The presence of this membrane has much to do with the retention of secretion in the supra-tonsillar fossa and when it becomes swollen and indurated it can cause a complete closure of the supra-tonsillar space. This is especially true when the tonsil has hypertrophied in an upward direction. It is common to observe tonsils which are so hypertrophied as to destroy this supra-tonsillar space by the extension of the tonsil upward and outward into the tissues of the soft palate. I have often observed tonsils which extended as far as the under surface of the Eustachian tube.

Thus it will be understood that material in the crypts of the top of the tonsil when squeezed by the action of the anterior and posterior pillars and the superior constrictor muscle of the pharynx, will find resistance at the mouth of the crypt as a result of which the material will be pushed deeper into the crypt. We therefore find these crypts extending to the external wall or capsule of the gland and filled with caseous material. This does not hold true of the crypts emptying directly into the throat from the fact that there is nothing to cover the openings of these and too because they empty downward and inward. When the patient swallows they are squeezed and the material contained in them is emptied into the throat.

If then we have the superior crypts, or the four which empty into the supra tonsillar fossa, which were called by the author, "*the infecting crypts of the tonsils*," filled with caseous material which cannot escape, we have the focus for an infection. The lining membrane of the crypt becomes infected first in the deepest part and we find the lymph nodes breaking down in this space. The infection as seen in the sections is less and less marked as you proceed from the deepest part of the crypt toward its opening. I have seen no specimen where the infection from one trabecular area has affected a trabecular area adjoining. From these lymph nodes which break down into true tubercular areas showing the epithelioid tissue with giant cells, the infection is carried to the submaxillary gland first and from this gland to other glands of the cervical chain of lymphatics.

100 State Street.

SARCOMA OF THE NOSE. TUMOR SPRINGING FROM THE LOWER TURBINATE. SUBSEQUENT ENLARGEMENT OF SUBCUTANEOUS GLANDS OF THE ENTIRE BODY.

BY WILLIAM C. BRAISLIN, M. D., BROOKLYN, N. Y.

An unusual feature of the case here reported was the involvement of the subcutaneous lymphatic glands by progressive extension from the region of the tumor, until the glandular lymphatic system was practically mapped out over the entire body surface by well-traced subcutaneous nodules.

The history in brief is as follows: Mrs. E. M., 57 years of age, and the mother of six children, was sent to me by her physician. Her complaint was of profuse nose-bleeds for a period of about a half-year, the worst of which occurred about five weeks before, when the hemorrhage was checked by her physician only after considerable difficulty. Since then, the affected side had been entirely blocked, and she had experienced some pain. There was a recurrence of nose-bleed on the morning of the day of examination. The affected (left) side of the nose was completely obstructed. Slight swelling was visible on the outside of the nose.

A diagnosis of sarcoma was made and an operation under ether was performed. The entire thickness of the bone was removed, so that the lower nasal fossa opened into the maxillary antrum. Hemorrhage was free, but was easily checked with adrenalin solution. The dressing used was iodoform gauze. Recovery was apparently complete in three weeks. The scar was clean, there was no suppuration, nor any sign of the presence of malignancy. In six months there was a slight recurrence, a small, edematous, easily bleeding tumor appearing at the anterior end of the scar, which simply created obstruction, no pain nor spontaneous hemorrhage existing. This enlargement was removed with the snare, with slight hemorrhage. Knowing that relief from snaring could be but temporary, a further operation was advised for the removal of the superior maxilla, but was declined; and the patient passed from observation for a period of three or four months. At the end of that time there was an aggravation of the symptoms, and she reported the appearance of several subcuticular nodules on the neck, axilla and breast. She was seen by me but once later, when I was sent for to call at the

patient's bedside. The left side of the face was slightly swollen. The nose was not markedly obstructed. Fortunately, her pain was but slight; but her physical condition had greatly deteriorated. The entire subcutaneous lymphatic system seemed to have become infected, and appeared in prominent nodules over the body surface. She considered herself doomed from the beginning of her illness, and had been unwilling to submit to measures for her relief other than as stated. This, though unsuccessful as regards the termination of her life, certainly tended to greatly relieve her suffering.

Twenty Cases of Chronic Suppurative Otitis Media Treated by Photo-Therapy. J. DIONISIO, de Turin. *Rev. Heb. de Laryngol., D'Otol. et de Rhinol.*, Oct. 13, 1906.

Dionisio, who has been an advocate of this method of treatment, and who has opened a clinic for the treatment of ozaena and chronic otitis media by means of photo-therapy, gives the result of twenty cases of several years' duration which had proved rebellious to medical treatment. Of these twenty cases, some unilateral and others bilateral, there were sixteen cures, dating from a period of three years to three months. In nearly all the patients there was a marked improvement in the audition. In two cases the improvement was so slight that they could not be considered as benefited.

In the patient who did not complete his treatment, there was an improvement only. In another, no benefit. The noticeable feature was the general improvement in the auditory acuteness, an effect which irrigation, cauterizations and other non-surgical methods had heretofore been unable to obtain.

SCHEPPEGRELL.

**SINUS THROMBOSIS AND NECROSIS OF THE HORIZONTAL
SEMICIRCULAR AND FACIAL CANALS, FOLLOWING
CHRONIC PURULENT OTITIS MEDIA;
CHOLESTEATOMA, PERISINUS ABSCESS, RESECTION OF
JUGULAR VEIN, RADICAL OPERATION, RECOVERY.***

BY LOUIS OSTROM, M. D., ROCK ISLAND, ILL.

Miss G.— S.—, age 22, seamstress. Family history negative. At 6 years of age she had diphtheria, accompanied by double otitis media purulenta acuta, which became chronic. At no time during the last sixteen years has the patient had earache, and only slight discomfort from a slight discharge. Hearing has at no time been good; in fact, preventing her from pursuing studies enabling her to teach school, which was her original intention.

For three or four weeks before I saw her, she suffered from constant headache, occasional vertigo, with nausea and vomiting, loss of appetite, extreme weakness and mental stupor, from which she could with difficulty be aroused, and into which she at once lapsed.

On June 5th, 1906, Dr. Eli Bradford, her physician, asked me to see her, when I found her in the following condition, to wit: She complained of great headache and tenderness on pressure in front of right ear, over the zygomatic roots, in the temple, and between the angle of the jaw and mastoid process (probably at the beginning of the jugular vein or bulb). There was no tenderness over any portion of the mastoid process or jugular vein. The meatus was filled with foul-smelling pus, and half filled with granulations and cholesteatomatous flakes, which microscope examination showed to be cholesterol crystals and mixed infection. Vertigo at this time was almost constant. With eyes open, it was clockwise, or from left to right; and with eyes closed, anti-clockwise, or from right to left; that is, the sensation was that of spinning around. The vertigo was less when lying on the left side, and very much worse when lying on the right side, when pain, nausea and vomiting were also aggravated.

On the next day, the granulation tissue in the meatus was snared off, and the tympanic cavity curetted under nitrous oxide

* Read before the Chicago Laryngological and Otological Society, Dec. 11, 1906.

gas. With the removal of a good deal of granulation tissue and cholesteatoma, she felt very much better; headache was almost gone; there was no vertigo, nausea or vomiting, though there was a slight tendency to vertigo when lying on the right side. Weak bichloride solution wash and iodoform alcohol drops were ordered to be used every three hours. During the next week she was quite comfortable, the only disagreeable feature being the tendency to vertigo when lying on the right side.



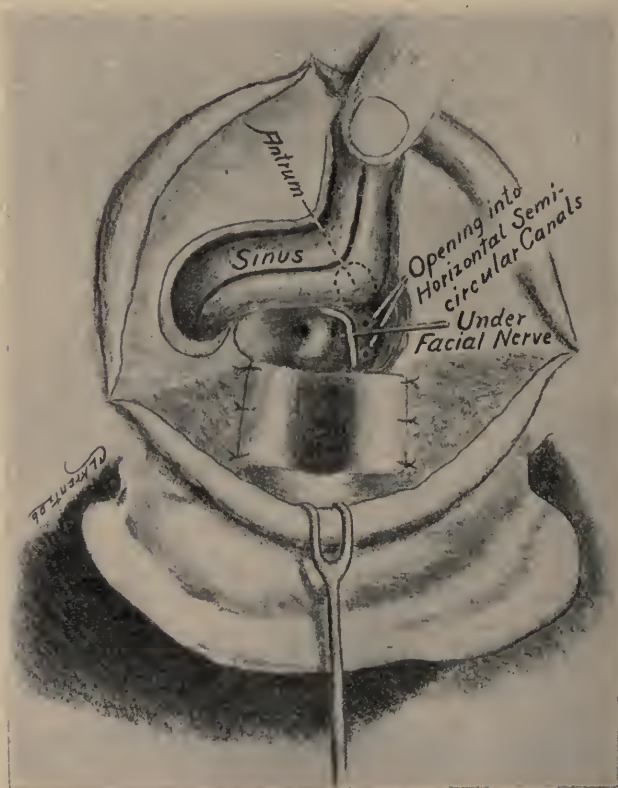
On June 13th she complained of pain "way in" in the right ear. There was no tenderness on pressure, vertigo increased, with nausea and vomiting and return of headache. In the evening she had a chill, followed by a temperature of $105.2-5^{\circ}$, pulse 120, respiration 26, and a profuse sweat. The same occurred twelve hours later, with facial paralysis of right side. Pulse at noon, 120; temperature, $99\frac{1}{2}^{\circ}$. She was sent to St. Anthony's Hospital for immediate operation.

June 14th.—Ether by Dr. Gaunt, assisted by Dr. Bradford; present, Drs. Dart and Snively. Temperature at time of opera-

tion, 104 2-5°; pulse, 140; respiration, 28. The usual incision was made back of right auricle, and with gauge and hammer I went through one-eighth inch cortex, and met necrotic bone, pus, granulations, and cholesteatoma; the upper one-half inch of sigmoid sinus was covered with granulations and pus (Perisimus abscess). The sinus looked suspicious, but filled readily on pressure above and below, respectively. It had an appearance between the normal pearly blue color and the lusterless pearly color. The sigmoid sinus was less than one-eighth inch behind the posterior wall of the bony meatus. The antrum was small, and covered externally by the sigmoid sinus, and filled with granulations and cholesteatoma. By reason of the anatomical relations caused by the far-forward sigmoid sinus and small antrum, the radical Swartze-Stacke operation was performed, in order to clean out the tympanic cavity. When it had been thoroughly curetted free from all granulations and necrotic bone, the horizontal semicircular canal was found necrotic with loss of all the ridge or prominence which is usually such an important landmark in this operation. The loss of substance exposed the two arms or tubes about three-sixteenths of an inch apart, into each of which a probe could easily be passed, and from which pus was oozing. The membranous canal was also destroyed. Just below it, the facial nerve was exposed by necrosis of its bony covering along its entire horizontal course, and one-eighth inch below the knee or bend, along its vertical course as far down as just below the pyramid for the stapedius muscle, that is, about three-eighths of an inch, in all, of the facial nerve was exposed, and a part lying free from its canal. Both the semicircular and facial canals were, of course, very carefully curetted free from all carious bone and granulations, and wiped dry with cotton swabs. The mouth of the Eustachian tube and the tympanic ring were thoroughly curetted with the purpose of obliteration. All that was found of the ossicles was the head of the malleus. A "T" shaped incision was made in the membranous canal and the flaps sutured above and below, respectively. The wound was closed by sutures, all the dressings and drainage being carried on through the external meatus. When the patient regained consciousness, there was no facial paralysis, she could open and close the right eye as well as the left, and facial movements were symmetrical. The pathological report of mastoid contents was mixed infection and cholesterol crystals. The blood count showed 82% of polynuclear leucocytes.

June 15th.—Temperature at 8 a. m., 99°. At 1 p. m. there was a chill, lasting about twenty minutes, with temperature, 105.4-5°; pulse, 144; respiration, 28; followed by a profuse sweat. By exclusion, the diagnosis of sinus thrombosis was made, and it was decided to operate the next morning.

June 16th.—Ether by Dr. Gaunt, assisted by Drs. Bradford and Arp. Present, Drs. Dart, Snively, Comegys, Bernhardt, West,



Sinus Thrombosis and Necrosis of Horizontal Semicircular Canals, etc.

DeSilva, Bennett. Before exposing the mastoid operative field, an incision was made along the anterior border of the sterno-mastoid from the mastoid process to one-half inch from clavicle. The jugular vein was duly exposed and separated from the vagus and the carotid artery. The facial, which was almost as large as jugular, and other tributary veins were cut between double liga-

tures, and the jugular vein removed between double plain catgut ligatures from near the exit from the skull to near the clavicle. An iodoform gauze cigarette roll was placed in wound for drainage. The wound was closed by continuous sutures, except lower one inch through which the gauze roll protruded. Dry iodoform dressing applied to neck. The mastoid wound was then exposed, sutures and dressings being removed. The mastoid cavity was free from pus, all looked well, and the meatal flaps were adherent and looked healthy. The openings into the horizontal semicircular canal were open and free from pus. The facial nerve looked healthy and its canal clean. Whiting's posterior incision was made, fully exposing the sigmoid and lateral sinus region. The sigmoid sinus looked thickened, and pearly, but lusterless. The knee and one inch of the lateral sinus and the sigmoid sinus downward to near the jugular bulb bared of bone, exposing healthy dura. When the sinus was incised there was free bleeding from the torcular, but none from the bulb, even after curetting into the bulb as far as the curette would reach. The two ends of the opened exposed sinus was packed with iodoform rolls, and after cutting away the infected free sinus walls, the brain area was dressed separately from the mastoid or tympanic cavity, care being used to so arrange the dressings that there should be no infection from one to the other. The posterior (Whiting's) incision was closed with sutures, also the upper portion of the original incision. Dry iodoform dressings were applied, with bandage including head and neck. Only once during the operation was the respiration embarrassed, but by dilation of the rectal sphincter respiration was re-established with no further trouble.

The facial paralysis was absolute for about two weeks, at the end of which time the eyelids could be moved a trifle. The movement of the facial muscles was fairly well established about three months after the operation. Now, six months later, there is no facial paralysis whatever.

When all was healed, a sinus as large as the body of an ordinary lead pencil existed behind the ear, communicating with the tympanic cavity. On November 9th a plastic operation was made for its closure. The upper and lower margin was freely split, and the skin along the entire length of the sinus undermined very freely, trimmed and sutured for primary healing, with the result that now there is no noticeable deformity, and the scars are barely visible, being hidden by the auricle and the patient's hair. The ear has been absolutely dry since first healing.

Repeated careful tests have been made to determine the amount of hearing in the right ear after recovery.

	Right—Open	Right—Closed
Acumeter	Right, 8 in.	Right, 4 in.
Whisper	Right, 3 in.	Right, 0 in.
Voice	Right, 18 in.	Right, 9 in.

The left ear was closed during test.

High tones (Galton whistle).....	2.
Low tones.....	Right, 512; left, 128

Bone conduction tests not considered reliable.

Résumé:

1st—Absence of mastoid symptoms.

2d—Alternating vertigo.

3d—Great exposure of facial nerve.

4th—Destruction of bony and membranous semicircular canal.

5th—Great number of complications (cholesteatoma, perisinus abscess, necrosis of horizontal semicircular canal and facial canal, sinus thrombosis, and facial paralysis).

6th—Early and complete recovery of facial paralysis.

— 7th—Retention of useful hearing.

8th—Far-forward sinus.

9th—Recovery with a dry ear and no deformity.

People's National Bank.

**REPORT OF A CASE OF ACUTE MASTOIDITIS COMPLICATED
BY AN EXTENSIVE DESTRUCTION OF THE ESOPHAGUS
WITH RUPTURE OF THE ESOPHAGUS LEADING TO
A PROFUSE HEMORRHAGE INTO THE LEFT
PLEURAL CAVITY, THE STOMACH AND MEDIASTINUM.***

BY J. O. M'REYNOLDS, M.S., M.D., LL.D., DALLAS, TEXAS.

The difficulty of the task before me will be appreciated when we remember that the literature on this subject is conspicuous by its brevity and incompleteness of reports, which are conditions antagonistic to a thorough classification of phenomena and a correct estimate of their value.

Sir Morell Mackenzie of London, the most distinguished laryngologist the world has seen, has carefully reviewed the medical literature of the world and has collected more or less fragmentary reports of thirteen authentic cases of rupture of the Esophagus, all terminating fatally from the resulting hemorrhage. As these cases covered a period of about two hundred years and occurred in different parts of the globe, some of them occurred under conditions that were unfavorable for accurate study and thorough description. So with your permission I will pass at once to a consideration of a case recently occurring under my observation and will conclude with some deductions which I feel would be worthy of our thoughtful regard.

CASE 1.—This case presented two separate and distinct conditions, having no connection whatever with each other. One condition was a perfectly plain acute mastoiditis supervening upon a sub-acute involvement of the mastoid antrum and middle ear cavity. The other condition was a complete rupture three inches in length in the lower third of the gullet supervening upon an extensive destruction of the esophageal walls, with resulting profuse and fatal hemorrhage into the pleural cavity surrounding the left lung, into the stomach and mediastinal space.

I was called first in the morning to see the patient, a robust looking boy, several days before his death and found him suffering with an acute inflammation of the middle ear with some pain and tenderness over the mastoid process and a small amount of discharge from

* Read before the Eleventh Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology, St. Clair, Mich., August 30, 31 and September 1, 1906.

the middle ear. I prescribed for him and left word that I should return to see him again in the afternoon. But before the hour for my second visit I received a telephone message that he was so much better that it was unnecessary for me to call. I then did not see the patient again for a few days, when I received a 'phone message that the family physician, Dr. A. C. Graham, was present and felt that my services were needed. I immediately visited the patient and found that he had just had a well-marked chill with a sudden rise of temperature to 104° F. by mouth. I inspected the drum membrane and found that the discharge had ceased, the membrane was of a dark mahogany hue and was bulging decidedly especially in the postero-superior quadrant. The family physician was unable to explain the sudden rise in temperature by his physical condition other than as found in the region of the ear. So I made the usual incision through the membrane allowing the bloody contents of the cavity to escape, thus relieving the tension in the middle ear cavity, and applied the usual subsequent treatment.

The next morning the fever was still 104° F. by mouth. The discharge from the ear had about ceased, the mastoid tenderness, while not extreme, was quite distinct, the drum membrane was dark red and covered with dead epithelial cells, the muscles of the neck were exquisitely tender on pressure and the slightest movement of the head would cause the patient to cry out with pain; vomiting which had now lasted for several days was becoming more pronounced, no food had been retained on the stomach for several days and frequent vomiting of bile had led to the administration of the mild chloride of mercury. The patient was growing weaker and a consultation was held, at which were present Dr. A. C. Graham, Dr. J. M. Pace, Dr. D. E. Seay and myself. The physical examination of the abdomen and chest failed to reveal any explanation of the high temperature, general prostration, frequent and persistent vomiting and intense thirst. All the physicians present concurred in the conviction that a prominent factor in the production of his symptoms was a rapid invasion of the inflammatory process from the mastoid antrum to the remaining mastoid cells, and this conviction was strengthened by the sudden cessation of discharge from the ear preceding the onset of the chill and subsequent elevation of temperature. These features were regarded as all the more significant because the patient had been for several years the subject of recurring attacks of middle ear inflammation with purulent discharge, since it is well known that in just such cases we will frequently find a very decided involvement of the deeper structures about the ear, with a

minimum degree of superficial disturbance. The existence of the ear affection was absolutely clear and there was no other diseased condition that was discoverable. Our duty then was positive and could not be disregarded. The indication was imperative to offer the patient the only means of relief possible in such a condition. Hence the unanimous conclusion of all the attending physicians was that a mastoid operation should be performed without delay.

The patient took the chloroform well under the careful and cautious administration at the hands of Dr. S. R. Milliken. The pulse under the anesthetic was reduced from 120 to 90 and continued strong and regular. After the operation, the pain in the neck, which had been very severe previously, now entirely disappeared, and the patient rested well with the exception of vomiting, which had now been present for several days. The conditions found on opening the mastoid were just as we had rationally anticipated. There was a decided amount of dead bone in the region of the mastoid antrum, which contained a considerable quantity of granulation tissue, which we find associated with the formation of pus and dead bone. As the acute invasion of the remaining mastoid cells had existed for only about 24 hours, there was only a limited amount of pure pus found in this situation, but this was quite distinct and was associated with an intensely inflamed state of those cells which had not yet become filled with pus. The picture emphasized in the most positive way the wisdom of operating before the purulent infection had extended to the brain. The operation was made in the usual way with the utmost caution and with the profoundest consideration for the important structures found in this region. And while the process of bone destruction had already proceeded to the walls of the lateral sinus not the slightest injury was inflicted upon any vital areas as was evident at the time of the operation and was subsequently demonstrated at the autopsy. The examination of the throat at different times showed a normal condition.

After the operation, the pulse and respiration continued strong and regular until the following day about four o'clock in the morning, when I received a 'phone message to come at once to see the patient as he was suddenly and rapidly growing weaker. I hastened immediately to his relief and found him suffering with the characteristic symptoms of profuse hemorrhage, and yet no blood was visible. He had a very rapid, feeble, thready pulse, very much accelerated respiration and cold extremities and his mind was as usual perfectly clear. I requested the family to summon the other physicians who had been in attendance upon the case, and without delay

began the recognized energetic treatment for concealed hemorrhage. At first he responded notably to the measures employed for his relief and then relapsed and became constantly weaker with a pulse no longer perceptible at the wrist. Finally the circulation through the brain became so sluggish that he became unconscious, bilateral convergent strabismus developed and this was followed by conjugate deviation of the visual axes. The pupils remained normal and vision distinct till towards the close of life when the pupils became widely dilated. There were no convulsive seizures or evidence of pain, and at no time was there any indication of meningitis. It was about two hours from the time of his sudden decline to the moment when the flickering flame of life went out. This evidently corresponded to the period after the rupture of the œsophagus with the consequent internal hemorrhage. Being totally unable to find any satisfactory connection whatever between his unexpected collapse and his ear trouble, which, since the operation, was pursuing a regular and satisfactory course, I requested a post-mortem examination, which was kindly granted by the parents. The autopsy was made within a few hours by Dr. B. Kinsell and Dr. S. R. Milliken, in the presence of Dr. A. C. Graham, Dr. J. M. Pace, Dr. D. E. Seay, Mr. J. T. Berry and myself. The brain was removed completely and most carefully examined throughout its extent and nothing abnormal was found.

The wound in the mastoid region was closely investigated and everything was found clean and correct and not the slightest injury had been inflicted upon any important structure. The process of necrosis had extended inward and backward to the walls of the lateral sinus and forward well into the petrous portion of the temporal bone. Then failing to find any connection between the intracranial condition and the fatal termination the inquiry was extended to the chest and abdomen. On opening the chest cavity everything on the right side was normal, but a large quantity of dark grumous blood was found in the left pleural cavity in the mediastinal space and in the stomach, and there was an extensive rupture through the walls of the œsophagus, about three inches long, just above its entrance into the stomach. The esophagus was deeply ulcerated over a large area, the rupture being due to the destruction going on in the walls of the gullet. There was no vomiting of blood because any effort at vomiting would only empty the contents of the stomach into the left pleural cavity with which the esophagus now freely communicated.

In looking over the literature on the subject I find that all of the thirteen authentic cases, reports of which have been collected by

Mackenzie, died within a short time after the rupture, with but one exception none of them were diagnosed before death and in this case the result was not altered and a fatal termination followed. They were all associated with vomiting, but none of them had taken chloroform or had passed through an operation of any kind, showing that the condition is essentially fatal in itself and does not require additional complications to determine the final result. Mackenzie states that it is likely that the normal esophagus never ruptures, and certainly this is in harmony with reason and the experience of the world, for we have all seen cases over and over again that would surely have ruptured the gullet, if any amount of persistent and extreme vomiting could alone have induced such a result. Moreover, the majority of these cases so far reported had eaten freely a short while before the perforation occurred and the rupture was favored by the sudden expulsion of large masses of food through a weakened and diseased channel. But in the case we are now considering, the patient had taken practically no food for about one week and on the contrary had been vomiting at frequent intervals during all this period, and hence no unusual strain was placed upon the organ at the morning of the rupture. In fact the microscopical examination shows an extensive disintegration of the walls sufficient to have caused a large perforation even without the intervention of any such exciting cause as persistent vomiting.

There have been many theories advanced as to the nature of the process existing in the gullet tending to favor a spontaneous rupture, and among these are diphtheria, tuberculosis, specific involvement, cancer, ante-mortem solution from contact with the digestive fluids, mediastinal abscess, and a very attenuated state of the esophageal walls dependent upon a congenital diverticulum. I have at hand sections for microscopical study of the adjacent portions of the œsophagus, but they do not clearly demonstrate the exact pathological character of the lesion. The case is almost without a parallel in medical literature and serves to impress some very important truths that are sometimes not duly regarded. First, the absolute necessity of withholding our judgment in fatal cases of marked obscurity until the final revelations of the autopsy shall have closed the chapter. Second, the absolute necessity of making not a partial but a complete post-mortem examination in every important case, not confining our inquiry to the organs apparently involved, but directing our search throughout the entire realm of possible disorders. Third, and finally, the plain and positive duty of every honorable member of our honored brotherhood to exert the full

force of his influence in directing into channels of conservatism and safety the unstable tide of public opinion in order that mankind may reap the rich harvest of good which a patient and plodding profession has planted. Our confrere, Dr. Emil Mayer, of New York, has reviewed the literature of the world bearing on this subject and has collected reports of six or seven other cases, making a total of about nineteen or twenty cases, including those collected by Mackenzie and the case I have the privilege of presenting today. I will not consume your time with further reference to the cases already reported, as Dr. Mayer will present them in full in his opening discussion.

Trust Building.

A Case of Primary Tuberculosis of the Pharyngeal Tonsil, associated with Tuberculous Cervical Glands. IVENS. *Lancet*, September 16, 1905.

Refers to the previous investigations in this subject by Woodhead, Latham, Stewart, Dmoschowski, Moore, Wendt, Megerand, Suchanek, Pilliet, Lermoyez, Dieulafoy, Brieger, Gottstein, Pluder and Fischer, Logan Turner, Lewin, Hynitsch, Lartigan and Nicoll, MacFadyean and MacCoulkey.

The author limited her investigations to examination of serial sections for the lesions of tubercle, and for tubercle bacilli. Thirty-five specimens of adenoids were examined. In thirty the appearances were those of simply hypertrophy. In four there was evidence of simple hypertrophy. In one well marked evidence of tubercle was found, but no tubercle bacilli.

ST. CLAIR THOMSON.

A CASE OF SPASM OF THE OESOPHAGUS.*

BY JOHN W. FARLOW, M. D., BOSTON.

Mrs. A., 50 years of age, has been the subject of several severe attacks of spasm of the oesophagus, occurring at irregular intervals, without apparent exciting cause. Her health has always been perfect. She is not in the least nervous, hysterical, anaemic, or dyspeptic; on the contrary, good, vigorous health has always been her good fortune.

Her father, always strong and well, who lived to be 75 years of age, and his equally strong brother, who died at 80, were both subject to attacks of apparent spasm of the oesophagus, at intervals of several weeks or months, during a period of many years. The attacks of the father and uncle practically always came on at the beginning of a meal, with the swallowing of the first mouthful of food,—soup, for example. The patient would have a distressed look on his face, place his hand to his neck, thus indicating the seat of his trouble. At times this spasm lasted several minutes, then gradually yielded, and the patient could continue his meal, a sense of soreness in the lower part of the throat remaining. Occasionally the patient would be obliged to leave the table, and the spasm would yield with the act of vomiting.

I was unable to learn that any particular article of food could be accused of bringing on these seizures. As regards the local conditions in the throat, I found nothing but a certain amount of chronic pharyngitis. Late in life these attacks occasionally appeared, but were rather less severe. They were always considered a personal peculiarity, and, as there were no symptoms between the attacks, and, as they did not increase in frequency or severity, no treatment was used.

Mrs. A. had a few slight attacks of discomfort in the throat when eating raw apple, nuts or dry bread, in which she was obliged to stop eating for a few minutes on account of apparent closure, or a feeling of constriction, in the upper part of the oesophagus. About four years ago, in the middle of luncheon, while eating a piece of raw apple, she became pale, looked distressed, put her hand to her throat and was evidently in great suffering, the pain being

* Read before the Twenty-ninth Annual Congress of the American Laryngological Association, Washington, D. C., May 7, 8 and 9, 1907.

in the lower part of the neck, but not extending to the back or arms. She was able to speak, and the pulse and respiration were not affected; she loosened the neck of her dress and went to the opened window; she was unable to swallow anything, even water. Hot applications to the neck seemed agreeable, but did not cause the spasm to relax. After lasting about 20 minutes, the pain stopped, some frothy mucus, which had collected in the throat, was expectorated and the spasm was finished. Examination of the throat later showed a slight chronic pharyngitis and a moderate enlargement of the lingual tonsil.

There was no other attack for over a year, when in the midst of perfect health, a similar spasm occurred while eating a piece of meat at luncheon. The pain and distress were much as before and diminished in 20 minutes, but began again in a few minutes, this time the pain being referred to a region lower down, nearer the cardia. Again there was a year's interval, when one afternoon, while eating biscuit, the same train of symptoms appeared, this time lasting three-quarters of an hour.

Beginning a few days later, massage of the neck was given for several weeks, cold compresses were used and local treatment for the slight trouble in the throat. Since then, about a year, there has been no trouble, but treatment may not have had much influence.

What is the nature of these attacks, and how are they to be differentiated? A young person in perfect health, while eating has a sudden distress in the neck. The first thing to be thought of is the possibility of a lodgment of food in the larynx, which would cause dyspnoea, perhaps complete loss of breath or voice, a condition which could last but a very short time. The voice would also be affected. In my patient the voice was normal and the character of the food was not such as to fill up the glottis, and there was no glottic closure. A large piece of food could be caught in the oesophagus and be held tightly by a resulting spasm, and the symptoms would be like those of my patient, except that the spasm would probably not be followed immediately by perfect ability to swallow food down into the stomach.

Angina pectoris would cause great dyspnoea, pain in the chest and radiating down the left arm, and there would be changes in the pulse and respiration. The previous history gave no evidence of a stricture or obstruction, and the absence of regurgitation of food and inability to swallow at times threw out the possibility of there being a diverticulum.

Oesophagismus, or acute spasm of the oesophagus, occurs not infrequently in nervous or hysterical subjects, but spasms of such severity and duration in a person in perfect health and without a local exciting cause is unique in my experience. The earlier and minor attacks seemed to be in the upper part of the oesophagus, while the distress in the severer seizures was apparently lower down, judging from the patient's statements and gestures.

How to relieve the spasm was a difficult matter. The patient was unwilling to allow the use of ether or anything that would cause unconsciousness. A subcutaneous injection of morphia might have relieved her, but in the two attacks which I saw she seemed hopeful that the spasm would soon relax and was very loath to have me use the opiate. As she could not swallow, and as there was much more mucous and saliva in the mouth, I did not think that cocaine or any local anaesthetic would be of service. The external, hot applications had but little effect. Another physician who was called in and arrived at the end of the spasm, which had lasted three-quarters of an hour, suggested the use of a tablet containing emetine, to be dissolved in the mouth, with the hope that enough would be quickly absorbed to cause a letting up of the contraction. He thought it would be well for her to carry some of these tablets with her, to take in case an attack came on when she was alone. I have had no experience with the drug, and a little experimenting might have to be done in order to find out what sized dose was necessary to bring about the desired effect. Perhaps a subcutaneous injection of 1/16 grain of apomorphia might suffice, but as it requires from 5 to 20 minutes to act, it might not really shorten the attack. An article by Dr. Hamilton Osgood, in the *Boston Med. and Surg. Jour.*, April 25, 1889, entitled "A Peculiar Form of Oesophagismus," discusses at some length the symptoms and nature of some of these cases, but nothing very satisfactory as regards relief of the spasm is given.

234 Clarendon St.

INTRA-NASAL DRAINAGE OF THE FRONTAL SINUS. INGALS' AND HALLE'S OPERATIONS.

BY E. FLETCHER INGALS, M.D., CHICAGO.

In May another short article appeared from Max Halle regarding our operations for Intra-Nasal Drainage of the Frontal Sinus. In calling attention to this subject once more, I wish my readers to thoroughly understand that Dr. Halle and myself have no controversy. He naturally has faith in his operation and I in mine, but in order that the reader may not be misled I wish to call attention to two or three points only, and then I will ask them to wait for a paper that I shall prepare within a few months, that I think will make the technic clear and will show that in suitable cases (which constitute at least 90% of all chronic empyemas of the frontal sinus) my operation is quite as effective as any other operation, and that it is less difficult and less dangerous than the external operation or any other internal operation yet described.

As stated in the third paragraph of Halle's article, page 378, LARYNGOSCOPE for May, I use a steel probe; but it is malleable, so that it can be given any desired curve, and I do *not use force* in passing it into the frontal sinus, nevertheless I can pass it into the sinus in fully 90% of the cases, by gentle manipulation and without the slightest danger. I readily admit that force would be dangerous in many cases. I have felt, and still believe, that the operation as originally recommended by me is as safe as any other, but the danger of perforating the tabula interna, which Halle thinks so great, has caused me to make three modifications in the technic that I believe fully eliminate all the risks that have been mentioned.

First, I pass the probe gently into the frontal sinus, and then have two Roentgen negatives made with it *in situ*, one from squarely in front, and the other laterally. This I have done several times, and I find that it shows accurately the relation of the naso-frontal duct to the tabula interna. If the duct is far enough away to cause no danger, the operation is done as originally proposed. If it is a little too close, a strong string is attached to the distal end of the spiral shield in which the cable of the burr revolves, and when the burr is set in motion the string is firmly drawn upon so as to draw the whole instrument as far forward as possible, as sug-

gested by Halle's criticism. If, however, the canal is close to the tabula interna, a shield is slid on over the burr to prevent it from cutting toward the point of danger. The opening made by my operation is 6. m. m. in diameter, and it never becomes narrower, because it is kept open by a gold tube until it is lined with mucous membrane.

That this opening is large enough in all cases when there are not great changes in the frontal sinus has been proven by the results in numerous cases. I believe it will be found large enough in 95% of all cases in which the operation is suitable; in the others, an external operation must be added to clear out the frontal sinus, and then the drainage canal made by my operation will be sufficient. It appears to me that there are serious objections to the very large opening into the frontal sinus, which appears so desirable to Halle.

Halle's operation, although appearing difficult and hazardous, certainly has some points of vantage as compared with the radical external operations, which are so much in favor by many physicians; and, from my standpoint, any safe and efficient intra-nasal operation that can adequately supplant the external operation is a boon to the patients. From present indications, I think that not more than 2% or 3% of all cases should receive the external operation, as the others can be cured quite as well by Halle's or my operation.

In conclusion, 1st, numerous operations by myself and others appear to have proven that my operation, as originally described, for draining the frontal sinus, is as safe as any other yet described.

2d. Numerous cases prove that the drainage is efficient and the gold tube absolutely prevents the canal from becoming narrower.

3d. The criticisms made have suggested to me modifications (already tried) that seem to eliminate all danger of perforating the tabula interna.

4th. I doubt the wisdom of making a very large opening into the frontal sinus, because it has been amply demonstrated that cures in nearly all cases take place with a canal only 6 m. m. in diameter.

After some further tests have been made I shall fully describe modifications of instruments and technic.

SOME IMPROVED NOSE, THROAT AND EAR INSTRUMENTS.*

BY EDWIN PYNCHON, M. D., CHICAGO.

Since our meeting at Denver two years ago I have made some further improvements in the tonsillotome I there exhibited. The change consists chiefly in the new position in which the handle is attached, as shown in the cut. This tonsillotome, as originally made, is illustrated and described in *THE LARYNGOSCOPE* of December, 1904, and a complete description of this later and improved form



Fig. 1. Improved Tonsillotome. $\frac{1}{2}$ size.

was published in the *Annals of Otology, Rhinology and Laryngology* of June, 1906.

I have found this forceps to be of use when the surface of the tonsil is very friable, making it necessary that a deep hold shall be taken, while, owing to the slight space required by the scissors handles, it is of particular value in doing a tonsil operation on a child under general anaesthesia. By use of the four rings as a handle it is easily used upon either tonsil when held in either hand. While this instrument is new since our last meeting, it was exhibited at the November meeting of the Chicago Laryngological and Otological Society and shown in *THE LARYNGOSCOPE* of December, 1905.

* Read before the Eleventh Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology, St. Clair, Mich., August 30, 31 and September 1, 1906.

In doing an operation in a cavity, as a tonsillotomy, when general anaesthesia is employed, a bright and easily directed form of illumination is of the greatest importance. To depend upon daylight, or upon a lamp held by an assistant, even with the help of a head re-

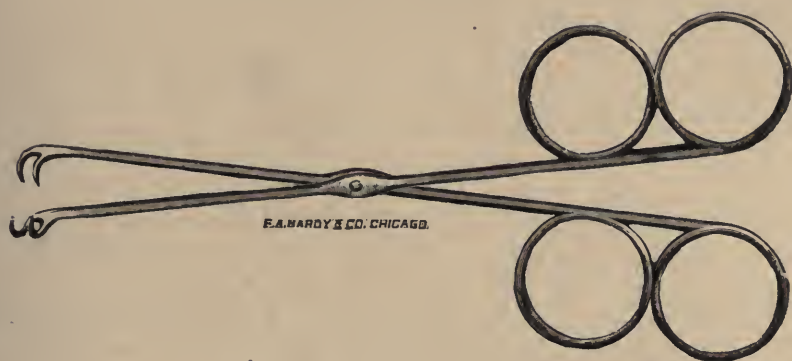


Fig. 2. Four Ring Tonsil Forceps. $\frac{2}{3}$ size.

flector, is, in either case, trying, and the small electric headlamps requiring low voltage give a light thoroughly inadequate. A half dozen or more headlamps for use without a rheostat, and with the 110 V current, have appeared during the last few years. These lamps have all developed a disagreeable amount of heat when used for any

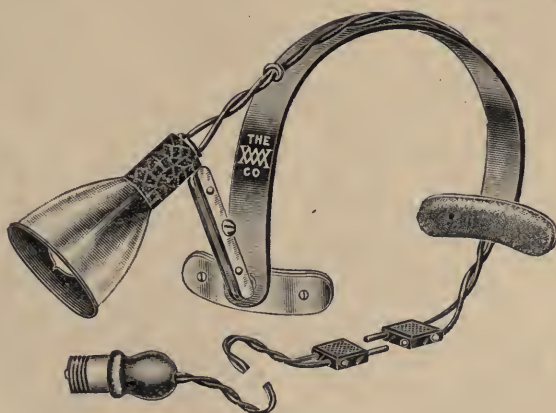


Fig. 3. Electric Head Lamp. 1-6 size.

length of time, and with most of them it has required holding the head in a strained position in order that the light be directed to the field of operation. In the device here shown the electric lamp is supported at the end of an adjustable bar which carries at either

end a ball and socket connection whereby the lamp is held about three inches away from the head while its rays are easily thrown upon the desired point, the operator's head and eyes meantime being in a perfectly easy and natural position. The lamp's supporting bar consists of two pieces, firmly held together by three screws, the central one of which regulates the amount of friction applied to either ball and socket joint. By thus having the lamp a distance away from the head the heat is much less noticeable, and is furthermore diminished by the use of only an eight candle lamp, so constructed as to heat to the minimum degree when in use. The head band is of spring metal with padded extremities and the connecting cord is provided with a safety disconnecter so the current can be easily broken, or so the operator can go about the room. The insulation is perfect so the wearer can in no way receive a shock. In order to concentrate the rays of light, and to furthermore protect or shade the wearer's eyes, the lamp is covered with an aluminum parabolic reflector. This lamp has been perfected for me by Wm. Meyer & Co. of Chicago.



Fig. 4. New Cautery Handle. 3-5 size.

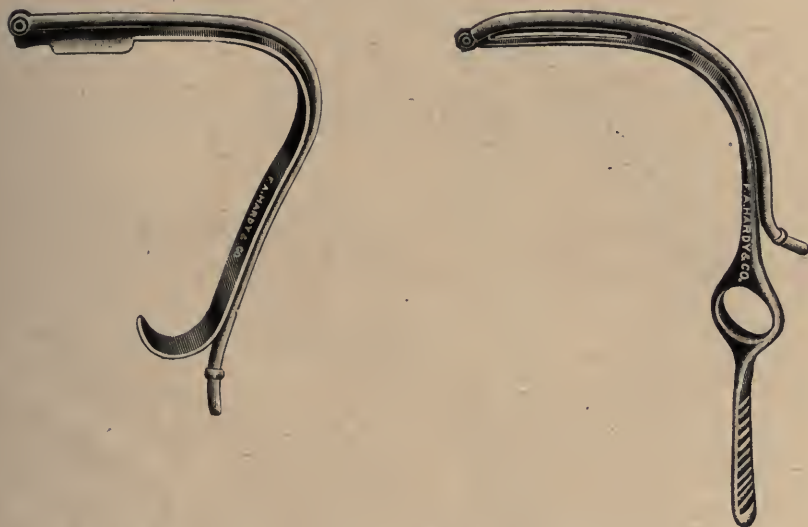
The essential feature in this new handle is that the contact is secured by the sliding of one tube in another whereby the possibility of corrosion is overcome and a perfect contact always assured. By a spring mechanism the current is automatically broken as soon as pressure is released from the contact lever. The electrode sockets are made extra long and are conical like the handle ends of the electrodes, so perfect contact and a tight fit are secured independent of the set screw, being therefore entirely free from the usual annoying wobble heretofore generally present. Furthermore, the electrode is held at an angle of about 110 degrees from the line of the handle, which affords much greater ease in use, whether the handle is held vertical or horizontal, thus being several degrees less than the angles generally employed. The sockets for the cords with the set screws are also extra heavy and solid. This new handle has been made in accordance with my suggestions by The Victor Electric Co. of Chicago. A windlass for the hot snare, while not shown in the cut, is supplied with the handle.

The Cautery electrodes I now use for tonsil work are of a new style and are thoroughly aseptic being made of two semi-circular



Fig. 5. Tonsil Cautery Electrodes. 4.5 size.

wires twisted about a strip of fiber, and are $5\frac{1}{2}$ inches in length. The burning point is of irido-platinum wire of No. 24 gauge.



Figs. 6 and 7. Tonsil Depressors with Saliva Injector attached. $\frac{1}{4}$ size.

By the addition of a saliva ejector tube to these standard and previously described tongue depressors (¹ and ²) an extra convenience



Fig. 8. Soft Palate Closer. $\frac{1}{2}$ size.

is secured wherever a fountain cuspidor with saliva ejector valve or other aspirating device is available.⁸

It occasionally occurs that a patient is unable by the usual methods to close the soft palate against the pharynx when it is desired to do inflation by the latter day (no water) method of Politzer. In such case the desired contact may be secured by mechanical means, for which I employ the instrument shown.

The Freer forceps, while an efficient instrument, possesses one drawback which I have aimed to overcome. I allude to the oval bite, back of which is an open space in which tissue may enter so as to prevent the withdrawal of the closed instrument without tearing the parts. I have changed the oval to an oblong bite with straight edges and one by which all tissue engaged is fully severed. The

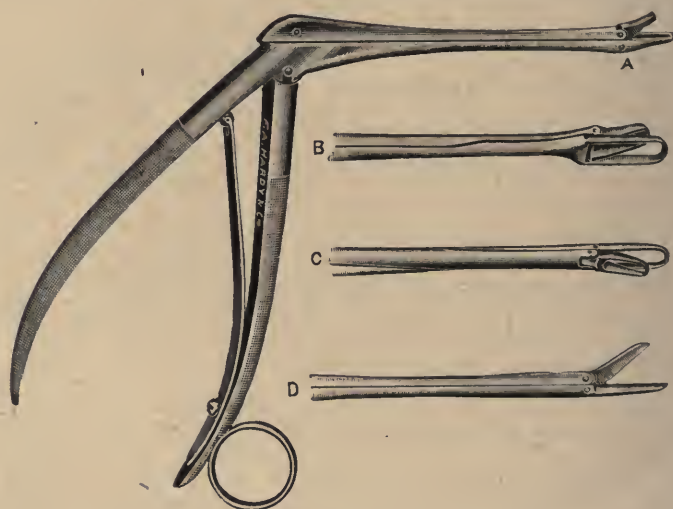


Fig. 9. Nasal Punch Forceps and Shears. $\frac{1}{2}$ size.

further advantage of the latter over the former style of bite, in order to leave a smooth edge to the operated bone, is apparent. I have furthermore added a roller bearing to the contact end of the handle spring and a ring at the proximal end of the lower handle for the little finger of the grasping hand, thereby preventing any tendency to slip in the hand when fully opened. This ring is also of use to hold the forceps when, for example, freeing the wound from blood before taking another bite. In this way the necessity of laying the forceps upon the stand is avoided. Additionally, by means of a small set screw located at the upper end of the fixed handle, the maximum spread of the biting blades can be adjusted as desired.

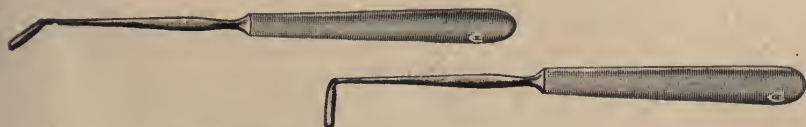
This forceps I have had made in three sizes and, with the largest one, good sized pieces can be removed from the perpendicular plate of the ethmoid during the window resection operation the same as with the Foster-Ballenger forceps, while the two smaller sizes are used in place of the Freer forceps alluded to. The shaft of the middle size (c) is twisted 90 degrees the same as the Freer instrument, while the largest size (B) is twisted only 45 degrees, which I find to be the best angle for the purpose for which it is intended. The smallest size (A) is untwisted and serves also admirably as a syntchia biting forceps. All of these instruments are "dissembled" by removing a spring set locking pin in place of a screw as in the Freer instrument. (Not seen in cut.)



Fig. 10. Blunt Periosteum Elevator. 3-7 size.

For operations upon the turbinals, Gruenwald designed a scissors the value of which has been indorsed by extensive use, though I have found at times that it did not possess sufficient power. In order to overcome this defect I have had attached to the handle shown in Fig. 9 the Gruenwald scissors (D) thereby securing all the power ever required.

This instrument I find will at all times take the place of the Hajek blunt elevator. I have given it a slight bend on the flat whereby when turned one way it is more suitable for working in a concavity, while when reversed it becomes more suitable for working on a convexity. The bend, though, is so slight that it may be used in either



Figs. 11 and 12. Small Angular Blunt Periosteum Elevators. 3-7 size.

direction upon a plane surface. Lastly, it will separate as well on the pull as on the push, which is at times of great advantage, as the periosteum not infrequently, when there are points of adhesion, can be better separated by working from behind forward, at least up to the point of greatest adhesion, than by working rearward, as is the usual custom.

I have found these small elevators, shown in Figs. 11 and 12, are sometimes efficient when the larger elevators cannot be used to advantage, particularly upon pronounced bends well forward.

This speculum can be fully operated with one hand and quickly adjusted as required, so as to remain fixed at any desired degree of spread, or can be instantly closed by pushing up the locking ring with the thumb. It also serves, like the Beck instrument, as a means of holding the two perichondria in apposition while the nostrils are being packed with gauze after the completion of the window resection operation.

Since its introduction by Bosworth the nasal saw has become one of the most useful of instruments in the armamentarium of the



Fig. 13. Mucosa Speculum. $\frac{1}{2}$ size.

rhinologist. The fact that numerous patterns have from time to time been advised by different operators proves that the varying conditions present require a corresponding variation in the saw best adapted to the particular case being operated, therefore a variety of saw blades is to be commended. In the device being described only one new style of saw blade is shown, the chief originality being in the adoption of a hollow handle which serves as a receptacle for the blades when not in use, thereby avoiding the features of misplacement or injury. While ten blades of uniform length are shown the handle holds only six, which is sufficient for general use. They are indicated in the cut by letters from a to j. The first six are suggested as the best selection for general use, though this number

may be either reduced or varied at the option of the purchaser. The blades shown are as follows:

A and B. McAuliff's probe pointed bevel-edged saws, the advantage of which is that they hug the wall from which the growth is being removed, the most elevated edge being against the wall.

C and D. Author's saw blades curved on the flat and probe pointed being of particular value in the removal of anterior thickenings of the septum, which are low down or springing from the nasal

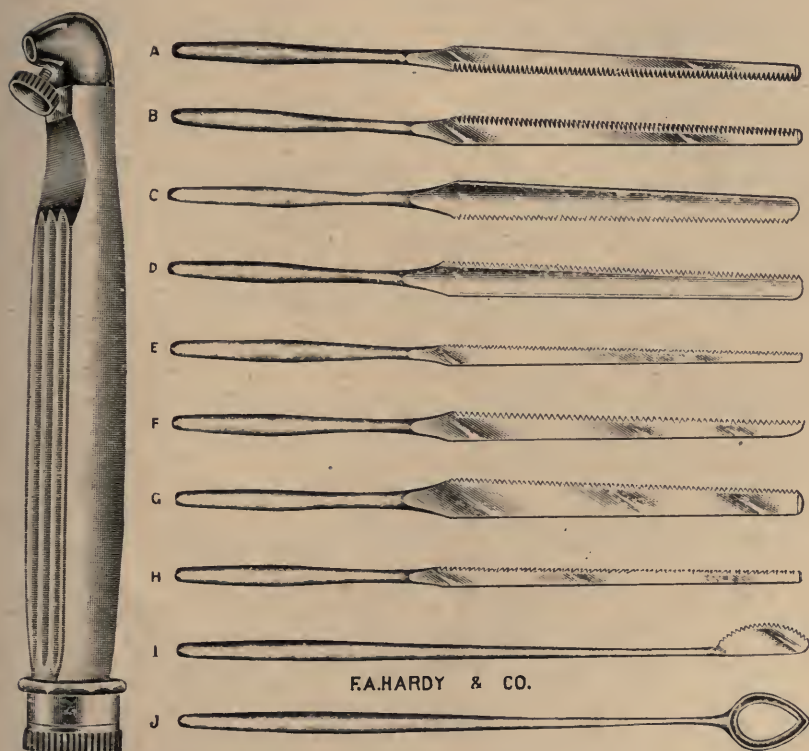


Fig. 14. Nasal Saws in Handle. $\frac{3}{4}$ size.

floor'. This saw is also of use, as suggested by Vail³, for enlarging the opening into the antrum after puncture through the inferior meatus has been made.

E. DeVilbiss cross cut saw, very small and delicate.

F. Bosworth's saw.

G. Webster's probe pointed saw for posterior growths, made extra thin at a point near the handle end, so when in use the bend upon pressure will be angular at the thin point, leaving the rest of

the blade straight, thereby facilitating easy cutting. With a blade of uniform thickness, when not too thick and rigid, there is a tendency for the whole blade to curve when operating a long ridge back of an anterior concavity in the cartilaginous portion of the septum, so the saw is soon found to bind. With the Webster blade this trouble is overcome, and I have often found it to be an extremely valuable instrument for removing ridges from the vomer.

II. Holmes' saw for the inferior turbinal.^o

I. Author's inferior turbinal saw.

Enlargement of the bony portion of the anterior end of the inferior turbinal is an occasional cause of nasal stoppage. When the scroll reaches too far down, or near the floor, with the accompanying hypertrophy of the covering soft tissue, nasal drainage may be so impaired as to cause much trouble, and particularly tubal stoppage as observed by Holmes. By the use of his saw (II) he advises division of the lower portion of the scroll, followed, of course, by amputation of a sufficient portion of the soft tissue. In this way impairment of drainage is corrected and relief given for those untoward symptoms due to the defective drainage.

In certain cases I have found that a further difficulty is to be overcome, viz: When the enlarged scroll not only reaches too near the floor, but when also the upper portion thereof is too near the septum. In such case the Holmes operation does not fully correct the deformity, and, therefore, the logical thing to do, after the Holmes operation, would be to fracture the upper part of the scroll so as to cause the remaining and projection portion of the turbinal to drop in its natural position, but, owing to the green-wood elasticity of the bone, it will not fracture as desired. By now using my turbinal saw, entered beneath the scroll, and cutting upward and through the bone until its resilience is destroyed, the projecting turbinal can be easily pressed down as desired, and retained in its new position by the use for a day or two of a Bernays-Simpson tampon. In this way the anterior hypertrophy of the inferior turbinal is fully corrected.

J. A spoke shave is added as a valuable adjunct to the set of nasal saws.

In a comparison of the many nasal saws which I have from time to time examined or purchased, I find that the length of the blade varies from 3 to 6 inches, and that the cutting edge varies from $2\frac{1}{8}$ to $3\frac{1}{2}$ inches. I have compromised by making all of the blades in this set of saws of a uniform length of $4\frac{1}{2}$ inches and the cutting

edge of each (excepting 1) $2\frac{5}{8}$ inches long, which dimensions will meet all requirements.

A further study of the saws of the past discloses the fact that there is a great variation in the angle at which the blade is attached to the handle, generally ranging from 110 to 140 degrees. After considerable experiment I have selected an angle of 115 degrees as being, for different reasons, the best, it allowing the hand to be held in the most easy and natural position and with least bend of the wrist.

The handle end of each blade is made round and conical, so a tight fit without wobble is secured regardless of the locking screw.

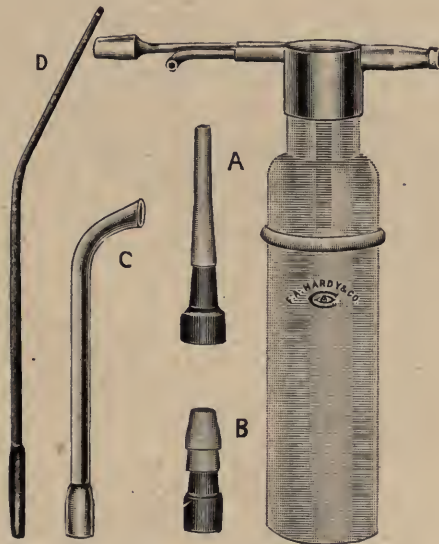


Fig. 15. Compressed Air Aspirator. $\frac{1}{2}$ size.

An additional advantage of this arrangement is that the blade can be rotated to any position desired. Formerly by reversing the blade it could be made to cut either upward or downward as the handle was held in its usual vertical position. I have found it at times advantageous to revolve the blade only 90 degrees from the vertical, in which case the handle is held horizontal instead of vertical, giving thereby an easy motion. This latter position would not be of use with the usual small handles employed, while in my saw, with a large handle which can be firmly held in the hand, this horizontal position is practical and at times more convenient for easy work. The set screw is located below the blade and toward the operator, serving as a rest for his thumb.

This device is made by making certain required changes in a DeVilbiss spray apparatus, and hence is of convenient size to hold in the hand and is operated by the use of compressed air, therefore the strength of suction can be easily regulated by adjusting the controlling valves of the air tank. I have found it of use for a variety of purposes, with the different extensions shown in cut, viz:

A. A hard rubber conical extension, more pointed and longer than "B", which can be introduced into a soft rubber tube or catheter. Its value in other departments of practice aside from otology and laryngology is apparent.

B. A short hard rubber conical tip (covered with a soft rubber cap) is used in the external auditory canal after a paracentesis or in the treatment of suppurative otitis. It can also be applied to the Eustachian catheter when in situ to remove secretions from the tube. It is a mistake to think that a tip of any kind when used with an Eustachian catheter must exactly fit the conical opening in the catheter end. Any tip when not too large, if covered with a bit of soft rubber tubing, will be found, with moderate pressure against the catheter opening, to be air tight, and its use is thus far more agreeable to the patient as well as more convenient to the operator. With this tip in the external canal, with a moderately strong suction, and with a succession of interruptions, by operating the cut-off lever, it gives the "suction with release" current which is of such value in the treatment of catarrhal deafness when the drum head is thick and retracted.

C. A metal tip with expanded end so bent as to give a lateral opening can be turned in either direction for the removal of tonsillar secretions. For this use a strong suction is required. When the same tip is turned with point up, it serves as a means of grasping the uvula during a post-rhinoscopic examination,⁵ being of particular value when the uvula is either elongated or enlarged. The traction can be sufficient to act slightly as a soft palate retractor.⁸

D. A long soft-metal tip, which can be bent as desired, is of inestimable value for the removal of blood during an operation and is far superior to the cotton swab. It is of especial value when doing a so-called "window resection" operation. If the tube becomes stopped by a blood clot it can be instantly freed by closing the air escape, when the negative is converted into positive air pressure.

5. With this device is furnished a hard rubber tip, like those used with hand nebulizers, for the external nasal opening. When

inserted in one nostril, while the other nostril is tightly closed, as well as the posterior end of the nose by pressure of the soft palate against the pharynx, as in Politzerization, a moderate suction can be secured which has some effect on the sinuses in acute conditions, though, with air pressure as ordinarily obtainable, it may not serve for the application of Sondermann's method of treating atrophic rhinitis and empyaemic sinusitis⁷.

F. A bell extension about one-half inch in diameter, not shown in cut, is of use as a dry cup or in the application of Bier's method of producing passive congestion. With another bell, suitably shaped for the eye, either continuous suction or suction with release could be secured.

Used without any extension tip it serves as an efficient wet cup or "artificial leech," the distal end of the suction tube being concave.

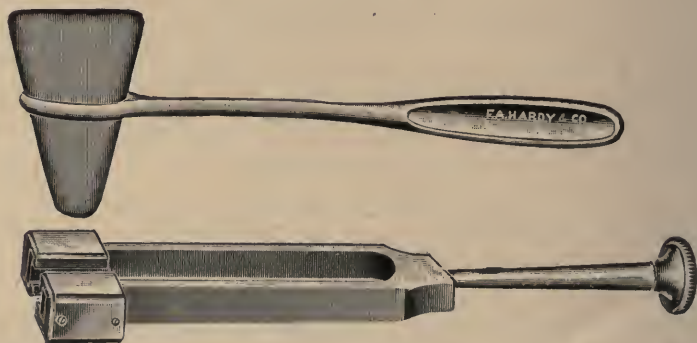


Fig. 16. Yankauer-Pynchon Cut-off. $\frac{3}{4}$ size.

In order to derive the greatest value from the use of this device it is necessary that it be operated with a positive working and "instant" cut-off which gives exit to a liberal sized air stream such as I next describe. At an early date I purpose writing a more extended description of this aspirator and its uses, in which paper I will incorporate a broader consideration of the value of aspiration in medical practice.

At a meeting of the section of Laryngology and Rhinology of the New York Academy of Medicine, Nov. 22, 1905, Dr. Sidney Yankauer exhibited a cut-off of a new design. As strong claims were made as to its superiority, I ordered one from the makers, Geo. Tiemann & Co., of New York City. It saw at a glance that the device gave promise of great merit, though it possessed the un-

pardonable defect of not being "instant." Furthermore, there at once occurred to me a means whereby, through the introduction of a small vent hole, this defect could be remedied. At my suggestion, Messrs. Tiemann & Co. made for me a second cut-off in which this idea was embodied as well as a few other minor changes. After several months' use of this cut-off I was convinced of its sterling merit, though its use developed other weak points, chiefly with the spring which actuated the thumb lever. I will here say that there are no springs or washers inside this cut-off to get out of order, and that in its operation no use is made of the force of the air current as an assistance in closing the valve, as is the case with other cut-offs. The control of air escape is regulated solely by the revolving of a conical metal plug, which rests in a metal socket of similar shape and size. In fact, in simplicity this cut-off outdoes all predecessors, being all metal, and aside from the thumb lever and its spring, consists practically of but two pieces.



Figs. 17 and 18. Tuning Fork and Rubber Hammer. 2.5 size.

In place of the faulty spring I have had Messrs. F. A. Hardy & Co. apply an improved spring, which I believe will stand the test of long usage. I also had them increase the weight of the thumb lever, which is likewise the friction spring for the valve, and furthermore, I had them make the valve less conical than before, thereby insuring a tighter fit which, in connection with the strong spring, corrects a previous tendency to leak when heavy air pressure was used. In order to provide for an unexpected break in the rubber tubing, I have added an additional tube fitting, which can be attached to a reserve tube so, should a leak thus occur, the cut-off can be quickly changed from the defective to the reserve tube. I have also provided a set-screw (not shown in cut) whereby the

cut-off can be fastened in a correct direction to conform with the kink of the tube. In this way, its outlet will always point directly towards the patient or in accordance with the operator's habit of use. With this cut-off, when the lever is swung to the highest point, a constant flow of air is secured, being of value in connection with the use of large office nebulizers. I might also add that this cut-off is easily taken apart or "dissembled" by spreading and removing the spring thumb lever.

I will lastly call attention to a tuning fork which I find of great value, and one which I use with frequency for rapid ear tests. It was a Politizer fork with movable weights. These I found very unsatisfactory, often becoming unfastened and giving a rich variety of overtones. In place of the movable weights I have had applied on either prong of this fork a very heavy and securely fixed weight so adjusted as to give a C 128 V tone. Each weight is fastened by two solid set screws and is additionally soldered in place, so after several years' use there had been no change to the slightest degree in tone, which in this fork is singularly pure, being entirely free from the usual array and variety of overtones.

In order to secure a constant intensity I find that use of a rubber hammer of good size to be the best method, the maximum blow being always given, which at the start causes the weights to touch so as to give a bell sound, though at once followed by the desired pure C tone. Lastly, I have also had attached to the handle of the fork an enlarged terminus, making it better for bone conduction. All of these instruments, as described, are kept in stock by F. A. Hardy & Co., of Chicago.

REFERENCES.

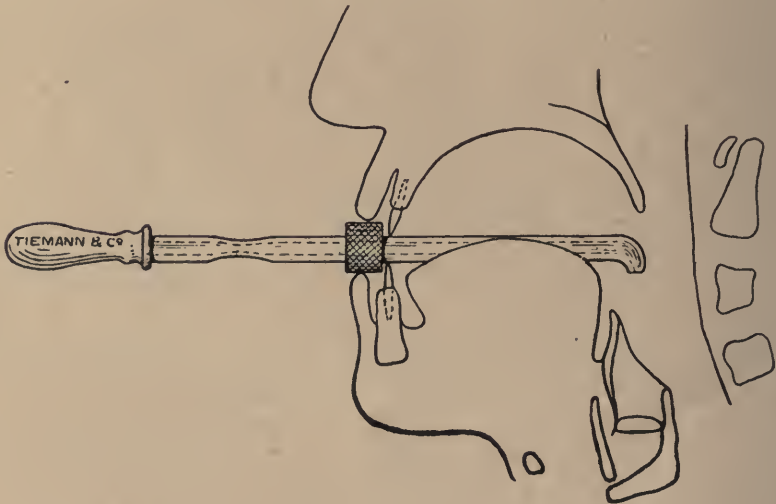
- 1 THE LARYNGOSCOPE, February, 1897.
- 2 THE LARYNGOSCOPE, December, 1904.
- 3 *Illinois Med. Journ.*, September, 1906.
- 4 *Ann. of Otol., Rhinol. and Laryngol.*, February, 1900.
- 5 Transactions of the Academy of Ophthalmology and Oto-Laryngology, 1906.
- 6 *N. Y. Med. Journ.*, September 29 and October 13, 1900.
- 7 *London Lancet*, August 12, 1905, p. 435.
- 8 THE LARYNGOSCOPE, March, 1907.

103 State Street.

A LARYNGEAL MEDICATOR FOR THE PATIENT'S USE:*

BY SIDNEY YANKAUER, M.D., NEW YORK CITY.

At the request of Dr. George Mannheimer, an internist of Mount Sinai Dispensary, I devised this little apparatus for the especial purpose of enabling tuberculous patients to make applications of thick and viscid fluids (orthoform emulsion) to the larynx at their own homes. The device has proven so efficient that I have extended its use to the self-treatment of other laryngeal conditions with entire satisfaction.



It consists of a strong glass tube, bent at right angles at one end, slightly flattened near the other end, and fitted with a small rubber bulb holding about 5ij.

The apparatus is adjusted to each individual patient in the following manner: It is introduced into the mouth until the bent tip is just beyond the uvula, while the shank rests against the upper teeth. The position of the incisor tooth is then marked by holding the finger against it. A piece of adhesive plaster is then wrapped

* Read before the New York Academy of Medicine, Section on Laryngology and Rhinology, April 24, 1907.

about the glass tube at this point, several turns being taken, until a flange about one-eighth inch thick is built around the tube.

The patient, having drawn the necessary amount of fluid into the tube, holds it by the flattened portion with the nozzle pointing downward, and introduces it into the mouth. The teeth are lightly closed upon the instrument, and the latter advanced into the mouth until the flange rests against the front teeth. If he now takes a deep inspiration or pronounces the syllable "Ah," and at the same time compresses the bulb with the other hand, the fluid will be injected into the larynx. If the nozzle happens to be bent too far forward, so that the fluid is injected in front of the epiglottis, the head must be tilted forward; if the nozzle is bent too far backwards, so that the fluid enters the oesophagus, the head must be tilted backwards. If the rubber flange is properly adjusted, so that the tip of the instrument does not touch the posterior pharyngeal wall, it will not cause gagging, and can be used with great comfort; but if the flange is placed too near the tip, the fluid cannot be made to enter the larynx.

Fluid of any consistency, watery, oily, or in the form of emulsion, can be injected into the larynx with equal facility. On account of its low cost, it is particularly applicable to dispensary and other poor patients.

The apparatus is manufactured by Messrs. Tiemann & Co., of New York City.

616 Madison Ave.

Trephining of the Labyrinth and Curettage of the Vestibule for Tinnitus. MATTE. *Deutsche med. Wchnschr.*, May 24, 1906.

The patient had the drumhead, malleus and incus removed at a previous operation. Matté opened the labyrinth between the round and oval windows, making an opening 3 mm. in diameter into the vestibule. The contents of the vestibule were removed by a thorough curettement. The patient recovered, the tinnitus ceased, and the hearing was not materially affected.

YANKAUER.

BOOK REVIEWS.

Wellcome's Photographic Exposure Record and Diary, 1907.

BURROUGHS WELLCOME & Co., London and 45 Lafayette St., New York City. Price, 50c.

This little pocket volume deserves to be a vade mecum for amateur photographers of small or large experience. It affords easy access to much valuable information about the timing of exposures with different plates and with the varying light of different months, hours and latitudes. Space is afforded for records of exposures and a diary for the year and memoranda pages are added. The various convenient tabloid preparations of Burroughs, Wellcome & Co., for the developing, intensifying, reducing and toning are presented. There is a special edition for the United States, for Canada and for the Southern hemisphere and tropics.

Original Reproduction of Normal and Abnormal Fundi.

A new chart illustrating two normal and twenty-two diseased conditions of the retina. Each illustration is an original drawing two inches in diameter in natural colors, by Miss ALICE S. CLEVELAND, under the personal direction of W. A. FISHER, M.D., Prof. of Ophthalmology and President of the Chicago Eye, Ear, Nose and Throat College. Size 22x11¼ in. Price 1.50.

This chart is intended to accompany Dr. Fischer's schematic eye, but independent of that it affords an excellent series of reference pictures which framed would make an addition to clinic or office walls.

A New Schematic Eye.

By WILLIAM A. FISHER, M.D., Prof. of Ophthalmology and President of the Chicago Eye, Ear, Nose and Throat College. With iris diaphragm and twenty-four pictured fundi each on a separate slide. Price, \$7.00.

In this schematic eye, Prof. Fisher presents a piece of apparatus which has been the outgrowth of his own needs as a teacher of the use of the ophthalmoscope and which should appeal to all engaged in similar work, as well as to students or doctors who may desire to acquire some facility in the use of the ophthalmoscope and to familiarize themselves with the conditions which may be revealed by this instrument, before undertaking the examination of a living subject.

The advantages of this particular schematic eye are the iris diaphragm by which a pupil of any desired size from 30 mm. to pin point may be obtained, and the number of fundi provided. Each of the twenty-four pictures represents a different condition of the retina.

ERRATA.

Page 577, 12th line from bottom, should read: No one is fully abreast with the subject, who has not read, etc.

Page 579, 3rd line from top, read *thus* instead of *this*.

THE LARYNGOSCOPE.

VOL. XVII. ST. LOUIS, MO., SEPTEMBER, 1907. No. 9.

ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding
that they are contributed exclusively to THE LARYNGOSCOPE.)

THE EUSTACHIAN TUBES IN INFANTS AND YOUNG CHILDREN; ANATOMICAL DIFFERENCES AS COM- PARED WITH THE ADULT TYPE; BEARING UPON TYMPANIC DISEASE.

BY PHILIP D. KERRISON, M.D., NEW YORK.

Two facts must have impressed themselves upon all physicians in large practice amongst children, viz: (a) The greater prevalence of suppurative middle ear lesions in children as compared with adults; and (b) the greater difficulty in bringing about a complete and permanent cure. That is to say, there are many cases in which after the discharge has ceased, the drum-membrane remains congested, and slight causes induce recurrence.

It is in partial explanation of the above facts that I wish to refer to the anatomical characteristics of the Eustachian tube in infants and young children. In length, direction, the relation which its calibre bears to its length, and the relation of its pharyngeal orifice to the nasal floor, the eustachian canal of the infant at birth differs materially from that of the adult. Probably the simplest way of emphasizing these differences and their significance in tympanic disease, will be to give first a brief resumé of the distinguishing features of the adult tube, with which that of the infant may be compared.

The Eustachian tube of the adult varies in length from 33 to 38 mm. Of this about one-third, the tympanic end, is bony, and two-thirds, the pharyngeal end, is membrano-cartilaginous. It commences in the anterior wall of the tympanum, about 3 mm. above its floor, and passes forward, inward and downward to its pharyngeal termination in the lateral wall of the naso-pharynx. In passing from the tympanum to the pharynx, its course describes a rather marked declivity, its pharyngeal orifice being on a lower level by

12 to 14 mm. than the tympanic.¹ At the junction of the osseous and cartilaginous portions is the narrowest part of the tube where the average calibre is about $1\frac{1}{2}$ mm. At this point (the isthmus), the two portions of the tube form a slight (i. e., very obtuse) angle, opening downward. The pharyngeal orifice is situated at a variable distance behind the choanæ, and is on the average of 9 or 10 mm. above the level of the nasal floor. These relations are easily remembered if we bear in mind the fact that the floor of the tympanic cav-

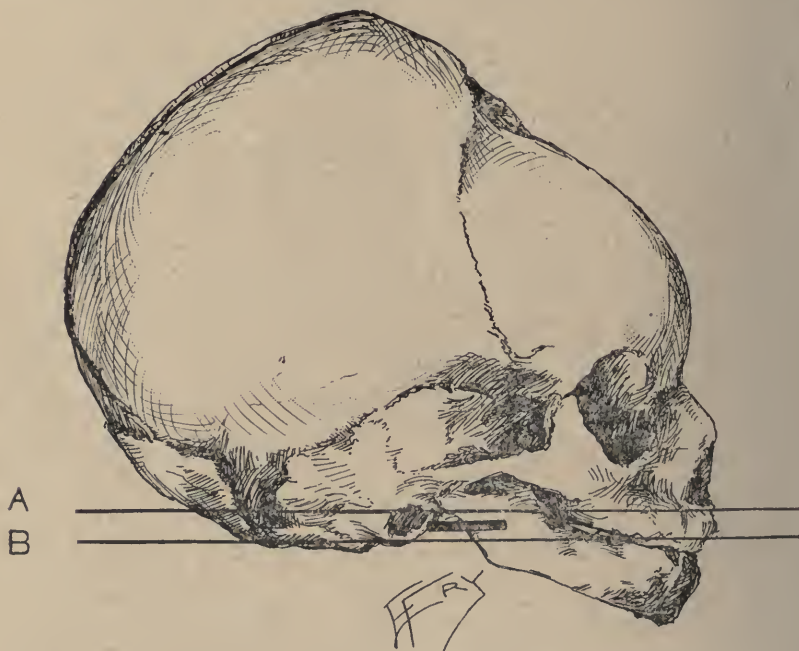


Fig. 1. Skull of Infant at Term.

ity is in the adult at least 20 to 22 mm. above the level of the floor of the nasal cavity, and that the pharyngeal orifice of the tube falls somewhere about midway between the two.

In the adult, then, the naso-pharynx communicates on either side with the corresponding middle ear cavity by a narrow canal, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches long, which commences at a variable distance behind the posterior nares, and 9 or 10 mm. above the level of the hard palate (nasal floor), and which reaches the tympanum by a considerable

1. The statement of Politzer, repeated by Bruehl, that the tympanic orifice is about 2.5 cm. higher than its pharyngeal opening is obviously incorrect, since with his estimated length of 34 to 36 mm., this difference in the level of its two extremities would bring the direction of the canal into a plane much nearer the vertical than it is known to occupy.

POLITZER. *Disease of Ear*, p. 38.

BRUEHL. *Atlas of Otology*, p. 37.

ascent. The length, position and direction of the adult tube are therefore in some degree favorable to the exclusion from the tympanum of pus or germ bearing fluids (secretions) entering the pharynx by way of the nose.

Relation of the tympanic and nasal floors in the infant at term. The main differences between the eustachian canal in the adult and in the infant are explained largely by the fact that while in the adult the floor of the tympanum is fully 20 to 22 mm. above the

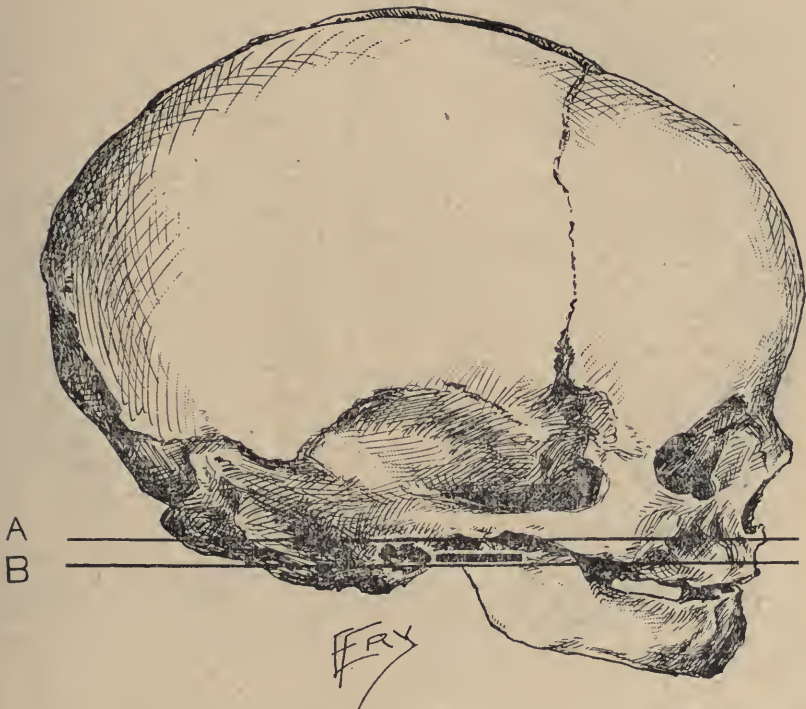


Fig. 2. Skull of Infant Three Months Old.

floor of the nose, in the newly born infant it is on a level somewhat below that of the nasal floor (Figure 1). With the infant as with the adult, however, the tympanic mouth of the tube is somewhat above the tympanic floor; the direction of the tube is therefore nearly horizontal.

Anatomical differences between the Eustachian tubes of the infant and the adult. In the newly born infant the Eustachian canal presents the following marked variations from the adult type: (1) It is of course much shorter, measuring not more than 14 or 15

mm.² (33 to 38 mm. in the adult). (2) The tympanic orifice and the calibre of the bony tube are quite as large as in the adult. The whole canal in proportion to its length is therefore much wider. (3) The two portions of the tube (i. e. membranous and bony) are more nearly in the same straight line, so that there is no demonstrable angle at their point of junction. (4) The whole tube is nearly horizontal in direction, so that while the pharyngeal orifice in the adult is on a lower level by 12 to 14 mm. than the tympanic

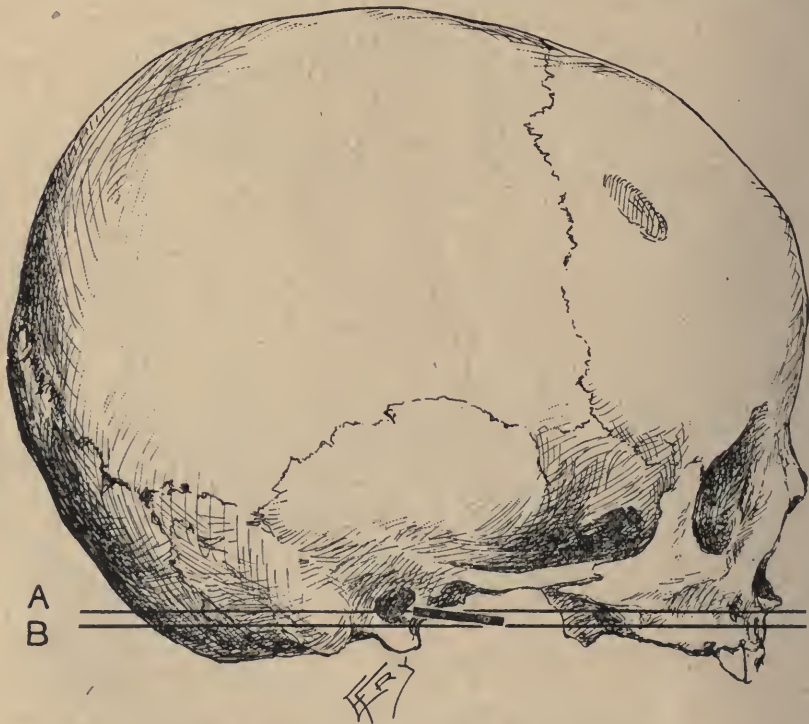


Fig. 3. Skull of Infant Seven Months Old.

orifice, it is on the same plane as the latter in the infant at term (Figure 1). (5) The pharyngeal mouth of the tube in the infant at term is on a level slightly below the hard palate; whereas in the adult it is some 10 mm. above the level of the hard palate. These above anatomical differences, while undergoing fairly rapid modification with the growth of the child, may be accepted as characterizing the tubal type in infancy as compared with the adult type.

2. Politzer's statement that the Eustachian Canal in the infant at birth is 18 to 20 mm. long seems hardly correct. Remembering that the infant tube is nearly or quite horizontal in direction, examination of the base of the skull of a foetus at term seems to demonstrate clearly that the entire canal cannot at this period exceed 14 or 15 mm. in length.

It would be a comparatively simple though tedious matter, were the material at hand, to make a series of longitudinal sections through eustachian canals representing different ages. Drawings from such specimens would lose value from their failure to demonstrate relations to important structures necessarily removed. In the accompanying drawings, the lines are accurately reproduced from skulls of different ages. They give accurately the comparative levels of the tympanic and nasal floors; and approximately the

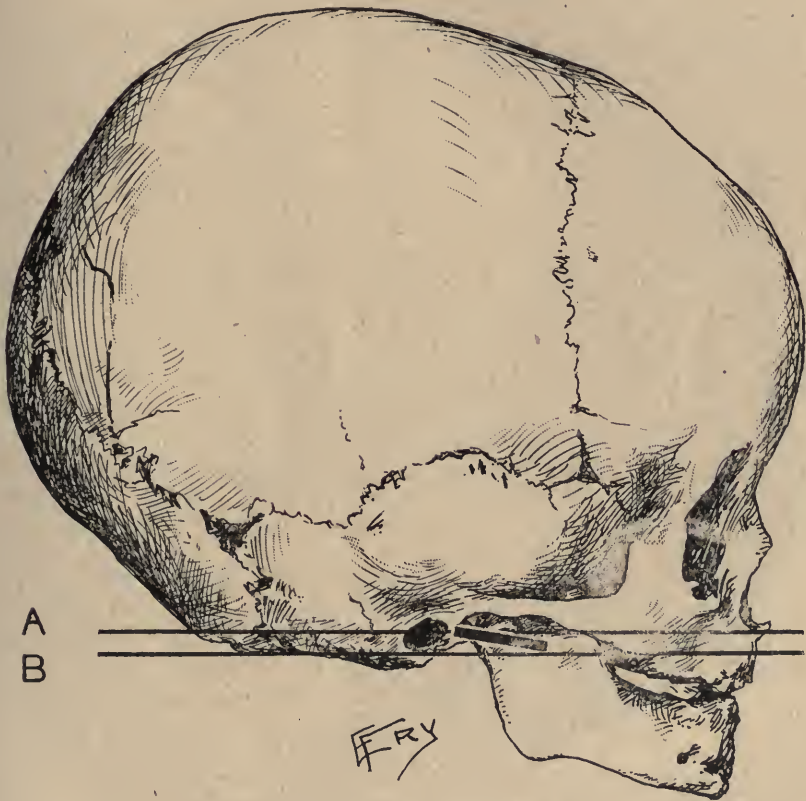


Fig. 4. Skull of Infant Fifteen Months Old.

direction—i. e. in relation to the horizontal plane—of the eustachian canals. The lines representing the eustachian tubes take no account of the varying directions of the membranous and osseous portions; they indicate merely straight lines passing through the tympanic and the pharyngeal orifices of the tube. They illustrate much more graphically than could any drawings from a dissection of the part the essential differences between the infant and adult tubes. To

the writer they seem also to throw considerable light on the predisposition of the first years of life to middle ear disease.

To epitomize: We find in the newly born infant a short, relatively wide, horizontal canal, the pharyngeal orifice of which lies a little behind the coanæ and on a level slightly below that of the hard palate. Its physical peculiarities seem, therefore, rather favorable to the entrance of germs either from the current of inspired air, or from the nasal secretions draining posteriorly into the pharynx.

Influence of adenoids upon the tympanic disease. When to this peculiarly open pathway there is added a mass of vascular lymphoid



Fig. 5. Skull of Child Two Years Old.

tissue, receiving and holding innumerable bacteria; subject to variations in bulk under any conditions causing naso-pharyngeal congestion, the danger of tympanic infection is greatly increased. This brings us to a mooted point in the management of such cases, viz.: the question of removing adenoids in patients suffering from acute purulent otitis media. Personally, I am inclined to believe that when a pharyngeal growth is clearly a factor in acute tympanic disease, the removal of the growth and the incision of the drum-

membranes should be done at the same time. This does not mean that in every case of acute otitis media we should search the nasopharynx for evidences of lymphoid hypertrophy, but simply that when such a growth is clearly a hindrance to tympanic resolution, the acute stage of a tympanic inflammation offers a favorable time

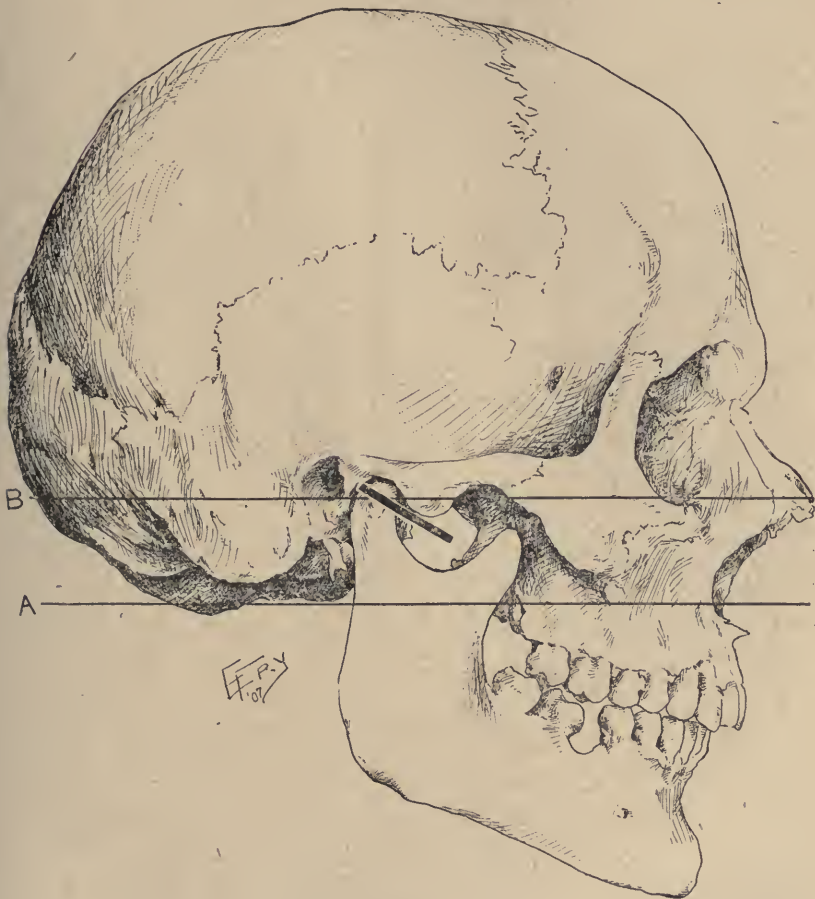


Fig. 6. Skull of Adult.

for its removal rather than a contraindication thereto. In support of this view may be cited the following facts:

(1) The operation of adenectomy involves some risks to healthy ears. It seems wiser, therefore, to operate during the acute stage of an existing otitis media when the ears can be safe-guarded by free incision of the drum-membranes, rather than wait and incur the risk of recurrence as a result of a delayed operation.

(2) The free abstraction of blood from the pharynx which always occurs during adenectomy usually relieves tubal congestion and hastens tympanic resolution.

(3) With a pharyngeal growth sufficiently large to perpetuate naso-pharyngeal congestion, recovery from acute tympanic disease is apt to be slow, and not in the final outcome complete.

(4) In the experience of every aurist, there are certain cases of acute otitis media in which all therapeutic measures fail until the naso-pharynx is cleared of adenoid tissue. Delay in such cases means added risks.

(5) Either myringotomy or adenectomy should be done with the patient under a general anæsthetic. Combining the two operations obviates the necessity of repeated anæsthetization.

Explanatory Note.—In the accompanying illustrations, the line A represents the level of the nasal floor, and B the level of the tympanic cavity. In Figures 1, 2, 3 and 4, representing skulls of infants at term, at 3 months, 7 months and 15 months, respectively, the floor of the tympanum is on the level below that of the nose. In Figure 5, drawn from a skull of two years' growth, the nasal and tympanic floors fall in the same horizontal plane, line A-B. In Figure VI., from an adult skull, the tympanic floor, (B) is 24 mm. above the level of the nasal floor, (A). In each of these illustrations a heavy black line represents the Eustachian tube, showing approximately its direction in relation to the horizontal plane and to the level of the nasal floor.

58 W. 56th St.

A REVIEW OF THE METHODS IN USE FOR THE REMOVAL OF ADENOIDS, WITH THE DESCRIPTION OF A METHOD WHICH IS THOROUGH, RAPID AND SAFE.*

BY GEORGE L. RICHARDS, M. D., FALL RIVER, MASS.

The tissue to which the term "adenoid" is usually applied is a soft, lymphoid mass lying in the vault and posterior wall of the naso-pharynx, and somewhat, though to a lesser extent, in the fossae of Rosenmüller, posterior to the Eustachian tube openings. It is an overgrowth of normal glandular tissue, designed to moisten this region, as well as help in the moistening of the inspired air. The adenoid becomes pathological on account of its size and its resultant interference with nasal respiration, face and jaw development, and proper aeration of the middle ear through its proximity to the Eustachian tube openings. It is also liable to acute and chronic inflammation and to tubercular infection. Hence its need of removal when so enlarged, or diseased.

What of the technique of the operation? While the need of the operation is well nigh universally recognized, and it is being largely performed by physicians of experience and without, its technique as usually performed seems to be very crude and not to have kept pace with the general advance of rhinology. Hence I bring the subject before you for further discussion, even though it may be thought that there is nothing new to say about adenoids, since this Association is to a large extent a teaching body and should help mould the thought of the profession so far as rhinology is concerned. The operations have been done rather blindly in a cavity where vision was impossible. The instruments have been mostly patterned after two models, though with many variations. First, some form of ring knife or curette which, when very sharp and skillfully used, will remove the growth, but when dull, as most frequently has been the case, since these are hard to keep sharp, only imperfect removal of the growth is attained, while, at the same time it tears the submucous tissue, leaving adhesive bands. These instruments are variously named, one instrument maker showing in his catalog twelve types. The curette of Gottstein or one somewhat like it has been the most popular. I am sure that anyone who has operated

* Read before the Twenty-ninth Annual Congress of the American Laryngological Association, Washington, D. C., May 7, 8 and 9, 1907.

much with this type of instrument, if he has had opportunity to re-examine some of the cases some years afterwards, must have found, occasionally at least, adhesive bands, to say nothing of possible injury to the Eustachian tube. Dr. Bliss, in a paper before this Association in 1898, made substantially the same statement, saying that apparent recurrence was probably due to cicatricial contraction after either incomplete removal or possible injury to the parts by the use of the curette.

In a paper read before this Association last year, "Removal of Adenoids Through the Nose," by Dr. Freer, he states very succinctly one of the disadvantages of the ring knife, "Its blade does not cut in the manner of a knife by slicing, as it is drawn through the tissues, but its edge impinges squarely against the material to be removed, with no sliding motion, so that there is a tendency to scrape over the adenoid masses rather than to cut them off, especially when they are freely movable and the vault of the pharynx is concave laterally so that the edge of the knife does not fit flatly against it." "A certain type of adenoid growth often encountered by me is also unfavorable for the ring-knife. I refer to the tough, firm, fibrous enlargement of the pharyngeal tonsil found in some children and often in adolescents and young adults. The blade is apt to slide over such masses without cutting away more than a small portion of them."

All these objections, as will be seen later, will be obviated by the method which I am about to describe.

The other type of instrument is some kind of cutting forceps of the so-called Löwenberg design, with its many modifications, some with blades that meet and some with invaginating blades, which removes the adenoid piece-meal, with as much more tissue as suits the fancy or lack of skill of the individual operator. No longer ago than 1906, in one of the largest and best-equipped clinics of this country, I saw an operator take a large Brandegee forceps, which is a modification of the Löwenberg, (an instrument which I have used and gave up many years ago) and after first bringing out a little adenoid, kept on until the third introduction brought mucous membrane and the fourth brought away unmistakable muscular tissue, when he announced that everything was out. It seems desirable to remove the adenoid, and this only, with as little destruction to the normal functioning of the region as is possible, so as not to condemn the little patient to a future permanently dry naso-pharynx.

In this connection I think we have dwelt unnecessarily much on the necessity of cleaning out the fossae of Rosenmüller on account of its effect on the ear. The main portion of every adenoid is central, and if that is removed, the little that remains in the fossae of Rosenmüller will not be of much account, and it is preferable to leave it rather than destroy the mouth of each Eustachian tube in the process of removal. Dr. Gradle, in a paper published in the *Medical News*, December 19, 1903, says: "Undue stress, it seems to me, has been laid on the extension of adenoids into Rosenmüller's fossae. Ordinarily the base of the growth does not extend quite so far laterally, though soft vegetations sometimes spread out along the surface. In rare instances lymphoid tissue really fills the fossae after the tonsil has been removed. This can only be taken away with a small curette, provided irritation of any kind indicates its removal. Large wing-like masses of lymphoid tissue which in rare instances descend from the fossae to below the level of the soft palate, I have found to be infiltrated reduplications of mucous membrane independent of adenoids proper, as they occur sometimes without the latter." As a matter of fact, the little that is in the fossae of Rosenmüller can usually be removed by careful manipulation with the small ring knife or a very small forcep of the original Hooper pattern, or even crushed by the tip of the finger itself. The eustachian tube lies quite a little distance in front of the posterior wall, on the side wall, projecting somewhat into the naso-pharyngeal space, and is affected by the adenoid by mechanical pressure or by reason of the general congestion which results from the adenoid. The tube mouth is cartilaginous and the adenoid does not of itself invade it. What adenoid is attached to the tube at all is on mucous membrane of the posterior and lateral surface of the posterior lip. I have paid particular attention for the last two years to this point, and while there is no doubt but that the Rosenmüller fossae frequently does contain some hypertrophied tissue, I think the importance of removing every last vestige of this has been overestimated, to the great danger of injury to the surrounding structures, and of producing more adhesions than one removes.

Various types of curettes, snares and forceps have been devised for the removal of adenoids through the nose, and have been enthusiastically recommended. A consideration of the anatomical relationships would seem to me to contra-indicate operations through this avenue.

The ideal operation is one which removes the adenoid tissue most thoroughly and rapidly and with the least traumatism, hemorrhage

and general shock. This is fulfilled more certainly so far as the instrument is concerned, by the adenotome of Schütz or some of its modifications, the detailed technique of which I shall describe. This instrument is on the principle of the old tonsillotome, cuts with a curved knife, and leaves a smooth surface, permitting rapid healing.

It was first described before this Association in 1897 by Dr. Farlow, who brought it home from Europe and had Codman and Shurtleff make up some from his model. The instrument, variously modified like other surgical instruments to suit individual tastes, especially by Gradle of Chicago and Schadle of St. Paul, has been used ever since. Hence I claim nothing whatever of originality. I am only trying to popularize its use. It consists of a sliding blade in a sheath, made to fit the naso-pharynx, and of varying sizes and widths, three sizes being needed.

Dr. Farlow first used it on young adults and without anesthesia. The first instruments as made by Codman and Shurtleff were rather



too long from above downwards for use in children, so that, like Dr. Farlow, for several years I used it only for young adults, without anesthesia, and so recommended it in two publications. It seems never to have become popular, however, judging from reports from surgical instrument houses, and in all the transactions of the American Laryngological Association from that date (1897) to this, I find no reference to it except in one instance by Dr. Farlow himself. If other members of the society have used it, it does not appear in the Transactions. The second notice by Dr. Farlow is in the Transactions of 1899, when he presented a large adenoid removed with the Schütz instrument. In general laryngological literature (American), I find but few references to this method: Gradle, in publications in 1901, his text book in 1902, and in a paper in 1903, strongly recommends its use. Schadle of St. Paul modified the instrument on the principle of the McKenzie tonsillotome, and I think described it in an article. Farlow previously referred to, my paper in Transactions of the American Medical Asso-

ciation, 1902, and my book on the Nose and Throat, 1903, page 193, are the only references I have found. I have looked up several text books, some more recent, but find no mention of the method. No doubt there are other references, but I have not happened to find them. Since procuring an improved type of instrument, made by Kny Scheeres Co., I have used it in nearly all cases with the greatest satisfaction. There are three sizes of the instrument, with cutting blades 13, 16 and 19 mm. in diam., and superior inferior distance 23, 25 and 26 mm., and they can be chosen with regard to the age and size of the child's naso-pharynx, a good plan being to have the middle and smallest size instruments always at hand. There are but few naso-pharynges where one size or the other cannot be used. I have so far met with none. The instrument is probably not of universal application; few procedures are.

As used on young children, the technique is as follows: The child being under anesthesia and held in the arms of a nurse, with a properly curved palate hook, a good view of the location of the adenoid can be obtained. (Anesthesia is not absolutely necessary, but is certainly to be preferred.) The growth is then palpated with the finger, and if it comes in contact with the postero-superior border of the choanae, it is shoved back sufficiently with the finger so that the upper edge of the instrument will not hit this portion of the adenoid, and therefore the knife fail to cut it. A little side dissection of the growth with the finger toward the center from the Eustachian tube mouths also aids in getting the growth within the fenestrum. The instrument is then pushed firmly back against the naso-pharynx, that is, sufficiently high and sufficiently posteriorly, and the knife made to cut through, the growth comes out in one piece, and the hemorrhage is not any more excessive than with the Gottstein curette, and usually ceases more promptly. The finger is next used for examination, when it is frequently found that there is a little lying in the lower cavity of the naso-pharynx, just above the atlas-axis articulation. The adenotome is again inserted, pressed firmly down into this cavity, the cut made, and the adenoid removed. Examination with the finger in most cases in young children will show everything perfectly clear. The finger is next carried up behind each Eustachian tube and the Rosenmüller fossae, and the adenoid, if any is there, is crushed out with the finger. As this in no way interferes with respiration, the finger is usually all that is necessary. If there is considerable there, it can be removed with a very small Löwenberg or Hooper forcep, or a small ring knife,

under the guidance of the finger. In a large proportion of the cases this is not at all necessary. The hemorrhage is staunched in the usual way and the operation is over. Examination with the finger a few weeks later shows a perfectly smooth, normal naso-pharynx as the result of the operation. No adhesive bands—no tearing of tissue. If, after the first cut, there seems to be some side pieces left, as is now and then the case, particularly with adults, the introduction of the smaller size instrument pushed firmly back and against the side wall, will remove these little tabs. Here care has to be taken in regard to the Eustachian tube to push the instrument far enough backwards before sliding laterally, as in Eustachian tubes with very large posterior lips it is possible to cut this lip with the blade. In one instance in my experience this was done. No result followed as it was simply the cutting off of a little cartilage. There was no earache, loss of hearing or any injury whatever, as there was no tearing or pulling of the tissue on the Eustachian tube. Should there be a little adenoid left directly back of the vomer, an ordinary Beckmann or some modification of the Gottstein curette will remove it, and I always carry these and the smaller forcep of the Löwenberg type in my armamentarium. As a rule, though, I do not use them.

In young adults and older children, I have used a palate retractor first suggested to me by Dr. J. E. Schadle of St. Paul, Minn., This consists of a piece of tape twenty-four inches long, the ends of which for six inches are twisted and then coated with paste and dried. One end is passed through each nostril to the naso-pharynx, grasped with a forcep and drawn out through the mouth, where it is held by nurse or patient. The traction draws the palate well forward and allows the instrument to be easily inserted. Here cocaine through the nose and by way of the mouth answers for anesthesia. The left forefinger, guarded with a sterile finger cot, is used for all examinations. As large an instrument as can be comfortably inserted is used. The first cut is made in the center, then if any side tabs be left, used sideways, first right and then left. The finger is then used, the small depression above the atlas examined, and the pad remaining, if any, then cut out. No further examinations are made.

Complications.—In one instance I have had earache; in one secondary hemorrhage six days later. Neither was of any particular account, and could have happened with any method, in fact, earache after operation is less common than when I used the curette.

Cautions.—Always use as large an instrument as the nasopharynx will comfortably take. Owing to its slenderness, the knife is occasionally broken (the Gottstein also occasionally breaks; numerous such instances have been reported), usually in the taking apart or putting together of the instrument, in both of which operations care must be taken. The blade should be kept sharp. A small cone slip of Arkansas oil stone is needed for this. The knife should slide freely.

Compare this with the bloody operation as shown in some text books, child on the back, head hanging over the table, anatomical landmarks all reversed, and I cannot conceive how one who has tried the method I have described sufficiently to become somewhat expert at it can ever go back to the older methods.

REFERENCES.

DR. OTTO T. FREER, Transactions American Laryngological Association, 1906.

DR. HENRY GRADLE, Text-book, 1902.

Post-nasal forceps, cutting laterally, designed by Jonathan Wright, Trans. A. L. A., page 113, 1892.

Schütz adenotome, described in detail with cuts by Dr. J. W. Farlow, Trans. A. L. A., 1897. At this time Dr. Farlow stated that he had used it generally with young adults, and with anesthesia. I first used it on the recommendation of Dr. Farlow, he having written me a personal letter in regard to it. These instruments were made by Codman & Shurtleff, and were rather too long from above downward for use in children. For several years I used it only for young adults and with anesthesia.

Paper on the recurrence of naso-pharyngeal adenoids, Arthur A. Bliss, Trans. A. L. A., 1898, page 89. Apparent recurrence probably due to cicatricial contractions after either incomplete removal or considerable injury to the parts by the use of the curette.

Personal Methods for the Operative Treatment of Pharyngeal Adenoids, D. Bryson Delavan, Trans. A. L. A., 1898, page 94. Instruments referred to, ring knives, sharp spoon, Gottstein instrument, finger nail, Lowenberg forcep, modifications of Gleitmann and Hooper wire snare or loop adenotome. Gottstein's knife most popular but incomplete. Goes through the lower part of the growth only. May leave one side full, the other empty, or fairly clears the vault and leaves abundant deposits on the posterior and lateral pharyngeal wall. Forceps and adenotomes to be used on adults only, and not on children. In the discussion Dr. Farlow referred to the Schütz pharynx tonsillotome; not mentioned by anyone else.

Trans. A. L. A., 1899, Dr. Farlow presented a large adenoid removed with the Schütz instrument. Same year, page 216, Dr. French presented a modification of the Lowenberg cutting forceps for the removal of adenoids. 1904, Dr. French showed another modification in which the cutting edges were as sharp as scissors. I find no other reference.

THE LARYNGOSCOPE, 1900, Dr. Martin of San Francisco showed an antero-posterior cutting forceps modeled somewhat on the lines of a Gottstein curette, which he had used with satisfaction.

Gradle, Pathology of the Pharyngeal Tonsil, with Observations on its Removal, THE LARYNGOSCOPE, 1901. This is a modification of the adenotome of Schütz, made of such size and shape as to fit closely every pharynx beyond about the fourth year of life. In younger children a somewhat smaller model is used. Firm pressure guarantees the removal of the entire tonsil in one piece. On the basis of the experience of 60 operations as compared with some 800 done in different methods, he states that the adenotome will in every instance remove the entire tonsil in one sweep. It is only when a timid operator does not press sufficiently that any adenoid tissue is left. The hemorrhage is just as sharp as with any other mode of operating, but does not last as long.

THE LARYNGOSCOPE, 1901, page 67, Wm. F. Clevenger, of Indianapolis, presents a cutting forceps for operating in the post-nasal space, modified Lowenberg.

Adenoids from the Standpoint of Hemorrhage, Kimball, Trans. A. L. R. O., 1900, page 128, curette preferred, Lowenberg's forceps or Hooper's modification referred to.

Is the Adenoid Operation a Justifiable Surgical Procedure, Geo. L. Richards, A. M. A., 1902, page 40. In a paper read before the A. M. A. at the Saratoga meeting in 1902, entitled "Is the Adenoid Operation a Justifiable Surgical Procedure?" I referred to various methods for removal of adenoids which I had seen in various clinics, and referred to the various methods in use, mentioning the Schütz adenotome, and referring to my own experience in its use, saying at that time that I did not think it adapted for very young children, preferring in them general anesthesia and the ordinary instruments. At that time I had not anything but the original Schütz instrument as made by Codman & Shurtleff, not the improved model I now use.

In a paper by Dr. Freer, *Journal A. M. A.*, Nov. 24, 1900, he refers to the use of the Ingals nasal bone forceps as necessary to complete any operation, and the type which he recommended at that time is that done with the Lowenberg forceps. Adenotomes, he says, need but be mentioned, as they cannot possibly fit every pharynx and can do serious injury on account of their great strength. They should be confined to adults and those children where a circumscribed growth can be accurately located. See also *Annals of Otolaryngology*, Dec., 1906.

Dr. Holmes, THE LARYNGOSCOPE, May, 1905, in an article on the proper position for the removal of adenoids, refers to the use of the Gottstein curette or some modification of that instrument, which is probably his favorite instrument, and his operations he does on the side.

Dr. Gradle has a further paper in the *Medical News*, December 19, 1903, having used the Schütz instrument in 250 operations, says that as often as he has reinserted the instrument a second time, he has often failed to bring away any more remnant, provided he pressed firmly enough in the first instance. Examination after healing shows occasionally a small fringe of adenoid tissue next to the upper rim of the choanae. These remnants were of sufficient size to demand a second operation but twice in over 200 cases. I find that where that is the case, the use of the ordinary Beckman curette disposes of them at the time of the original operation.

THE LARYNGOSCOPE, May, 1901, Holmes reported two accidents from the breaking of the ordinary Gottstein or modification of it.

Hueber, *Archives of Pediatrics*, March, 1901, if, after a few weeks, it is found that all the growths have not been removed, a second curetting can be done. (Comment superfluous.)

Jarecky for adenoids in very young infants, had an oval curette constructed. It must be admitted that no type of the Schütz instrument could be used in children of a few months old.

Observations on 1000 Adenoid Operations, Frank B. Sprague. Reference to the mesh of cicatricial bands resulting from the tearing of the growth with the finger nail, and one case where the fascia and muscle tissue had been torn from the posterior lateral wall of the pharynx leaving a bad deformity, but the adenoids were still present. He operates with forceps after the Hooper pattern, but a little larger, repeatedly introducing the forceps until all redundant growth is removed, being careful to protect the muscle and fascia from injury. He uses the finger nail for any mass which may be in the fossae of Rosenmüller, and he considers it of the greatest importance to carefully clear the fossae of Rosenmüller; otherwise a safe condition of the ears and good hearing cannot be assured. Care must be taken not to injure the tubercle of the atlas.

(Comment—Before using any instrument, the growth should be oriented sufficiently with the finger to know whether one has a prominent atlas or not. The base of the Schütz instrument is usually above any such prominent atlas.)

84 N. Main St.

The Examination of Hearing in School. M. MALHERBE ET STACKLER. *Bull. Med. No. 23.* 1906.

The authors base their conclusions on the examination of 588 scholars. They claim that examination for deafness in scholars should be compulsory, the results reported to the teachers so as to guide them in the instruction of the scholar.

The report should also be made to the parents, as it is of utmost importance for the future of the child, not only for its health, but also for a choice of profession.

SCHEPPEGRELL.

**CASE OF EXTRA-DURAL ABSCESS. SEPTIC THROMBOSIS
OF THE LATERAL SINUS, COMPLICATED BY
PREGNANCY. OPERATION, WITH RECOVERY.**

BY GEORGE L. TOBEY, JR., M.D., BOSTON.

On August 10th, I was called by Dr. J. Goodwin of Clinton to see the following case: An Italian woman, twenty-three years old, married, and seven months pregnant.

May 6th, three months previous, she had been admitted to the Clinton Hospital with a profuse suppuration of the right middle ear and marked tenderness, with oedema over the mastoid. Slight jaundice. Temperature 100°. There was no blood count. The patient refused to submit to mastoid operation and was discharged "Unimproved—against advice" on May 7th.

August 9th, she was readmitted with the following history: After leaving hospital, the discharge from the ear, varying in consistency and amount, continued till three weeks ago, since which time the ear has been dry. The tenderness over the mastoid has persisted to date, but pain has not incapacitated patient for work, that of keeping house. Ten days ago, the oedema over mastoid began to rapidly increase and the tenderness became more marked. There has been no vomiting nor chills. Slight dizziness for two days. Severe occipital headache two or three days.

Physical examination showed a well-developed woman, fairly nourished. Heart and lungs normal. Eight months pregnant. Urine negative. On the right side of the head there was a prominent swelling extending from a point $1\frac{1}{2}$ -2 cm. posterior to auricle to the occipital protuberance, and from a point 1 cm. from the median line to a level corresponding to the tip of the mastoid process. This swelling was firm and no signs of pain were elicited on pressure.

Over the mastoid bone itself there was very slight oedema and tenderness was elicited on deep pressure only. There was marked sagging of the posterior and superior canal walls. The membrana tympani, pale pink in color, was slightly oedematous, although the landmarks were readily made out. There was no perforation. Spoken voice heard at four feet. Blood count showed 14,300 leucocytes. Temperature 99.8. Pulse 120. Respiration 20.

OPERATION.—Ether. An incision started just above auricle and $\frac{1}{2}$ cm. posterior thereto was carried downward and backward to the tip of the mastoid process. The periosteum when elevated showed the cortex white and firm. The sclerosed cortex was removed with chisel and mallet. The cells were found to be diploetic in character and filled with foul creamy pus. The antrum was opened with gouge and curette. The diploetic cells, all of which contained pus and granulations, were found to extend for 2 cm. above the temporal ridge in the squama and for $1\frac{1}{2}$ cm. forward in the zygomatic process.

It was found necessary to enlarge the wound, and a posterior incision was made at right angles to the original on a plane passing through the middle of the external auditory canal. This incision was made through the swollen area, in which was apparently a very marked venous stasis, as the tissues were engorged with dark venous blood. The periosteum when elevated showed no apparent superficial osteomyelitis.

The bone cavity was enlarged. Broken-down diploetic cells extended for 1 cm. posterior to sinus; beyond this point the bone was apparently healthy.

When the lateral sinus was exposed, its walls were apparently normal except over a small area high up, which was dark and granular. The tegmen antri et mastoidei were found to be soft and necrotic, and their removal evacuated about one drachm of foul greenish pus from the middle fossa. The dura was dark, soft and granular at this point, but no perforation of the dura was found.

The tip of the mastoid was not removed.

The horizontal incision was partially closed with silkworm sutures and the wound packed with iodoform gauze. The membrana tympani was incised and a small wick placed in the external auditory canal.

Good recovery from ether.

August 11—Patient comfortable. No pain. Temperature 97.7° . Pulse 104.

August 12—Temperature 98.4° . Pulse 89. Outer dressing changed; posterior wound apparently clean. Slight moisture in the canal; small amount of boric acid insufflated.

August 15—Middle ear dry. Packing removed from the mastoid wound. The cavity was clean and repacked lightly with iodoform gauze.

August 17—Mastoid clean and granulating well. Oedema persists.

August 20—During the last twenty-four hours patient has complained of severe frontal and occipital pain, requiring morphia. Temperature 99.2°. Patient mentally clear. No dizziness nor nausea.

August 22—At 9 a. m., the wound was dressed and found to be clean and granulating well. During last night the patient complained of severe abdominal pain. Vomited several times during the forenoon and labor-pains continued with increasing severity during a. m. Patient delivered at 12:05 p. m. of a premature (dead) child.

August 23—Temperature normal. Complaints of headache. Lochia normal. Vulva pads changed s. o. s.

August 24—Morning temperature normal; evening temperature 102.4°. Complained of severe headache during the day. Breasts full, red, and painful. Lochia normal, wound clean. Breasts pumped; epsom salts.

Blood—Whites 20,300.

Poly. m. n. leucocytes.....	69%
Small lymph.....	16%
Large lymph.....	12%
Eosinophiles	3%

August 25—The temperature is irregular. Complaints of pain and soreness of breasts. Breast pump used every four hours. Lochia normal.

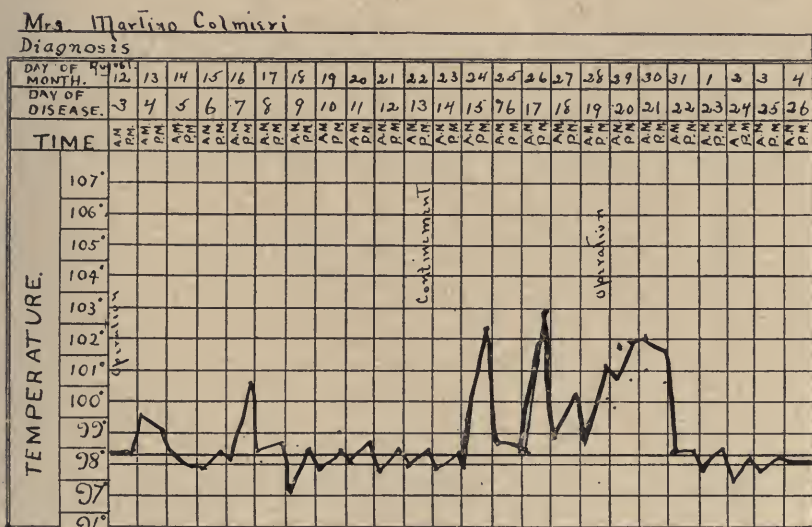
August 26—Temperature varies from normal to 102.8°. Severe headaches.

August 28—The septic temperature continues. There have been no chills nor chilly sensations. Heart and lungs normal. Eyes normal. Lochia normal. Breasts red, full, and tender. Severe headache. Patient drowsy. Mastoid wound filling with firm healthy granulations. On deep pressure below the tip of the mastoid there was no tenderness, but a small drop of pus appeared in the mastoid cavity 1½ cm. above the tip and midway between the sinus and posterior canal wall. A small middle ear probe was passed into a minute sinus leading in direction of the jugular bulb. There is no diminution in the swelling which was present at the time of entrance to the hospital. Blood count showed 14,900 whites with 68% of the polymorphia-nuclear leucocytes.

The question of a septic thrombosis of the lateral sinus and jugular bulb now arose. I advised an exploratory operation, to which the patient consented.

OPERATION.—August 28—Granulations half filling the original cavity removed with curette. Lateral sinus freely exposed and found to be covered with dark, soft granulations and to be firm to the touch. Bone was removed from the sinus from above downwards toward the bulb.

A small fistula discharging foul pus, and into which a probe could be passed for two-thirds cm., was found just above and leading into the bulb. Wound packed temporarily.



The internal jugular vein was exposed in superior carotid triangle at level of the cricoid. As it was apparently free from thrombus at this point the vein was ligated. The ligature was above the facial branch. The incision in the neck closed with interrupted sutures.

The lateral sinus and the upper portion of the bulb were then freely exposed by removal of the bone with the rongeur. A long incision was made in the sinus, but there was no bleeding, as the vessel was filled with firm blood clot. The bulb itself was filled with foul greenish pus. Bulb curetted as far as possible. No bleeding from below. No bleeding from upper portion of sinus on

compression of the opposite jugulars. The clot was removed with the curette and it was necessary to go nearly to the torcula herophili before there was free hemorrhage.

The wound was then packed with iodoform tape, a wick being passed into the bulbus from above.

Good recovery from ether.

August 30—Complains of frontal headache. Temperature remains high—101-102°. Lochia normal. Breasts soft and not sore. Magnesium citrate, q. s. daily. The packing was removed from the lower portion of wound and about a drachm of pus found in the bulb; this was removed and wound repacked.

August 31—Temperature has dropped to normal. No headache. Patient much brighter.

September 2—Temperature remains normal. The breasts cause no trouble. No headache. Incision in neck healed by first intention and sutures removed. Packing removed from mastoid wound. No bleeding from sinus and the cavity is granulating well. Light packing. White count, 14,200.

September 6—Patient is gaining rapidly. Mastoid cavity rapidly filling with healthy granulations. Small sinus persists leading into the jugular bulb, which latter is nearly obliterated by firm granulations.

September 9—Temperature remains normal. Breasts soft. Lochia normal. Mastoid wound clean and granulating well. The swelling over the side of the head is slowly diminishing. Discharged, improved, September 11.

The wound was dressed at intervals for four weeks, at the end of which time it had completely healed. The swelling persisted for several months, but when the patient was last seen in March it had disappeared. The hearing is normal.

The following features of this case are worthy of mention.

1. The long interval between the active suppurative process in the mastoid in May and the appearance of symptoms of a serious nature in August, a period of three months, during which time there was an apparent quiescence of serious symptoms.

2. The fact that the middle ear and drum were apparently normal when seen in August.

3. The absence of chills which are looked upon as diagnostic in septic thrombosis of the sinus.

4. I am now convinced that the lateral sinus was filled with an uninfected thrombus at the time of the first operation. This thrombosis causing a backing up of blood in its superficial branches, which was not readily taken up by collateral circulation and gave rise to the marked swelling of the side of the head. There being no constitutional symptoms such as temperature or chills, I did not feel warranted in opening the sinus at this time.

Two weeks later when the thrombus had broken down and the jugular bulb was filled with pus, the condition was masked by a complicating mastitis, following the birth of the child. The temperature was in no way inconsistent with a simple matitis without other complications, thus making the diagnosis of a septic thrombosis of the lateral sinus very obscure.

416 Marlborough Street.

Involvement of the Internal Ear after Concussion of the Brain.

RHESE. *Deutsche med. Wchnschr.*, Leipzig, April 19, 1906.

Rhese finds the following aural symptoms characteristic of concussion of the brain: 1. Nystagmus towards the healthy side. 2. Diminished bone conduction. 3. Diminished aerial conduction, especially for notes of medium pitch. 4. Peculiar shape of the "curve of hearing." 5. Similarity of the affection in both ears. 6. Diminished hearing for the watch, but not for speech. 7. The fact that the auditory nerve becomes rapidly exhausted when tested with the tuning-fork. 8. Positive Rinné. 9. Congestion of the upper wall of the canal.

YANKAUER.

EVERY-DAY CAUSES OF VOICE DETERIORATION.

BY PERCY FRIDENBERG, M. D., NEW YORK.

At a recent session of the Section on Laryngology and Rhinology of the New York Academy of Medicine, the evening was devoted to a symposium on the Causes of Voice Failure in Public Singers. But a single speaker widened the scope of his remarks to include voice failure in general. More than one of the listeners to the discussion which followed must have been impressed by the fact that practically nothing was said about the common and usual causes of vocal defects, or about the generality of vocal defectives, while much erudition was displayed in the analysis of singers' voice, tone production, vocal methods, graphic registration of sound, and other highly scientific aspects of the case with which the average practitioner rarely has to deal. The public singer forms a very small percentage of the population, and a part which is naturally protected by every possible means against voice defects and strain. The singers at a very early stage of their training learn the importance of natural and sufficient breathing, and have been taught by practical experience as well as by instructors how to take care of the musical instrument of which they are the fortunate possessors. It is known that singers are, figuratively speaking, wrapped in cotton wool and allowed to do nothing which could spoil the quality of the voice. They are most careful as to what they eat and drink, as to exposure to changes of temperature, even slight physical exertion, smoking, and above all, as to how and when they use the voice. Add to this that singers are able to command the services of capable specialists, that they are qualified to recognize the earliest symptoms of vocal disturbance and interested financially as well as physically in prompt treatment, and we shall begin to realize that voice defects are not a common and prevalent evil among professionals.

There is a class, however, in whom these defects are common. The question of voice defects in the public at large, is a feature of this question which, to my mind, is of great practical importance. Comparatively few laryngologists number public singers among their clientele, or at least this class is a very small percentage of those seen daily. On the other hand, we see and hear large numbers of people whose voices are injured by common causes, most of them

preventable, and we pay very little attention to these cases because we do not see them in our offices as patients, but come across them in the every-day walks of life. The commoner causes of voice defect and voice deterioration in the average healthy individual may be arranged in three classes, and depend on climatic conditions, including wind and dust; improper use of the voice, with the factor of strain in loud talking as it is made necessary by our noisy environment, and, finally the lack of attention to voice culture and voice care in our schools. Climate is of great importance for the voice. It is impossible to consider this phase of the subject at length. The point of special interest here is that sudden changes of temperature or of humidity induce catarrhal conditions which not only directly affect the voice producing organs, but may injure the voice even if these portions of the upper respiratory tract are not directly involved. Thus, in nasal or pharyngeal diseases, any attempt to clear the throat by hawking, irritates and strains the vocal cords. As this injurious strain is repeated again and again by those suffering with nasal obstruction or accumulated secretions, a state of chronic irritation of the vocal apparatus is easily produced. Frequent coughing and sneezing have a similar effect. Dust and dirt and the irritant gases of city streets are particularly deleterious in causing the expulsive reflexes just mentioned and in giving rise to acute infections. This is only one feature of city life which adversely affects the voice. Another and a very important one is the constant noise. In our larger cities it is impossible to keep up a conversation out-doors without unduly raising the voice, and on most car-lines it is necessary to shout in order to be heard. In this city the roar of the elevated railway is added, making high pitch and over-exertion inevitable. The amount of effort expended is apparent when we note the facial contortion, the intensity of oral motion, and the loud tone heard during a sudden lull in the street noises. Women are the worst offenders, as they will continue to carry on a conversation at the top of their voices, while most men will, literally, shut up until there is a possibility of being heard without tearing their throats out. American women have been said to converse "like shrieking canaries," and this is one of the causes. Another is to be found in the lack of attention to voice and speech in the home and in the school. In our mixed population, each element contributes some peculiarity or irregularity not only of accent and pronunciation, but of modulation, intonation, and timbre, as well. Each has some typical defect, and some have a large number. Instead

of this being corrected at school, the teachers themselves, sprung from the ranks of the immigrant, are like the blind leading the blind. Anyone who has listened to the exercises of one of our New York public schools will remember the common, slovenly and unmusical speech of the average public school teacher. Distinction and precision of speech are often considered affected, even snobbish. It is a fact that nowhere is grace of speech and voice more truly a class distinction than in this country. The Spaniard, be he grandee or peasant, speaks with beautifully clear and agreeable tones. The French are known for the elegance, distinctness, and distinction of utterance. Even German, rough as it may sound to unaccustomed ears, is spoken distinctly and plainly. Among the English, refinement of utterance is the hall mark of good breeding. The great United States language, and especially the variants heard in our large cities, is a marked exception to the rule of clear and agreeable speech. It is true that "elocution" is taught in our schools, and that there are daily recitation exercises, but little if any heed is given to inculcating the production of beautiful tone, and the precept is nullified by bad example and evil communications which corrupt good speech no less than good manners. The schoolboy imitates the tough and vulgar accents of the street gamin, the college "man" takes as a pattern the variety actor, the professional athlete and the "sport" in diction, as well as in intonation. The home is a correcting influence only in those communities in which there is homogeneity of race, or in the mansions of the wealthy where English governesses and maids are employed and the children have a chance to forget the "American" language.

60 E. 58th St.

A CASE OF BILATERAL ABDUCTOR PARALYSIS OF THE LARYNX.*

BY CHARLES H. KNIGHT, M. D., NEW YORK.

The differential diagnosis of adductor paralysis, abductor spasm and ankylosis of the crico-arytenoid articulation is often very difficult. A conclusion can be reached only after prolonged observation under various conditions. Especial care is needed to decide which element predominates when several co-exist. No doubt may arise in acute crico-arytenoid arthritis, but in chronic cases there are often but few distinctive signs. More or less odynphagia, painful cough, tumefaction over the joint and pain on pressure along the posterior border of the thyroid cartilage are mentioned by Escat among the symptoms. In addition, the laryngeal mirror shows that the arytenoids are jammed together on phonation, instead of the sound one crossing in front of its disabled fellow, as seen in paralysis. (Grabower.) In ankylosis the vocal bands are tense, in paralysis they are flaccid and a sort of "flapping" movement in respiration is discernable. Moreover, other general symptoms indicative of some constitutional disease are present. Spasm of the larynx may be quite persistent, as for example in hysteria, but it is usually clonic, or the position of the vocal bands varies from time to time.

Until within recent years, abductor paralysis has been regarded as one of the rarest laryngeal neuroses, no less an authority than Stoerk having made a declaration to that effect. Yet seven years ago a list of 118 cases was collected by Wilson (*THE LARYNGOSCOPE*, September, 1900), and no doubt others might be added at present. Allowance being made for probable errors in diagnosis there still remain enough genuine cases to take the affection out of the catalogue of curiosities. The origin of the disease may be central or peripheral, generally the former when both sides are involved. The causes assigned are various; tabes, syphilis, pressure from swollen glands, aneurism, or a new growth, diphtheria, hysteria, lead poisoning or other toxemia, fright, voice strain, peripheral neuritis, are all mentioned by different writers. In a large majority of cases there is a positive history of syphilis. It sometime occurs at the very onset of tabes, as a so-called *laryngeal crisis*, and again it

* Read before the Twenty-ninth Annual Congress of the American Laryngological Association, Washington, D. C., May 7, 8 and 9, 1907.

develops only after the diagnosis of ataxia has been firmly established by other phenomena.

In three cases reported by Lockard (*Ann. of Otol. Rhinol. and Laryngol.*, March, 1903,) the laryngeal paralysis was detected 7 to 22 months before any other symptoms of tabes. In 22 cases of tabes examined by Sendziak, paralysis or paresis of the abductor, unilateral or bilateral, was found in seven. From his own observations, which include 45 other cases, and from those of Burger (71 cases), he concludes that posticus paralysis is almost pathognomonic of tabes and often precedes other symptoms by a considerable interval. It appears that in these cases a suspicion of syphilis is justified and that always the laryngeal condition should be regarded as a possible forerunner of tabes. On the contrary, from an examination of 20 cases of locomotor ataxia in certain Philadelphia institutions, W. B. C. Harland reaches the conclusion that involvement of the larynx in the early stages of this disease is very uncommon.

In the absence of paralysis nothing more than hyperemia may be discovered with the laryngoscope, but the parts are abnormally sensitive and an attempt to make an application to the larynx, or even the mere examination may provoke a spasm. On the contrary anesthesia may exist. The discovery by Semon and almost simultaneously by Rosenbach that the fibers of the posticus muscle are exceptionally vulnerable, and the equally important discovery by Risien-Russell and Onodi that filaments to the abductor and the adductor muscles run in separate bundles in the recurrent nerve have explained many phenomena of laryngeal paralysis previously obscure. The nerve filaments to the abductor are afferent and excite reflex tonic spasm in that muscle, those to the adductors are efferent and are simple motor nerves. Thus the physiologic law that the irritability of afferent nerves is exhausted earlier than that of efferent nerves comes into play in determining an isolated posticus paralysis (Friedrich). The abductor, a respiratory muscle and solitary, is opposed by several adductors, phonatory muscles, the latter being not only more numerous but more powerful. Their superior strength and resistance is further explained by Grabower by the observation that the nerve endings in the adductors are more numerous, broader and firmer than in the abductor. These differences are a natural provision to meet the comparatively greater functional demands made upon the adductors. In paralysis of the larynx they are the last to yield and the first to regain power in case of recovery. It is hard to reconcile the divergent views regarding the musculature

and the innervation of the larynx held by different observers. They may be due to individual anomalies, to faulty observation, or to the fact that experiments on the lower animals are misleading as regards the human species.

P. Schultz finds no sympathetic fibers in the recurrent, while Broeckaert believes that the laryngeal muscles are supplied by the sympathetic. The latter also opposes Semon's law and asserts that the external thyro-arytenoid muscle possesses less vitality than the posticus and is the first to show signs of degeneration. The views of Krause (1884) and of Grossman are well known, and the Hooper-Donaldson controversy before this association is still fresh in our memory. In a recent paper the palato-pharyngeus muscle is referred to as a "cord-stretcher" by tilting the thyroid cartilage. As a matter of fact, the comparatively insignificant fasciculus of this muscle attached to the thyroid assists in fixing that cartilage, while the crico-thyroid muscle, with its origin at the lower border of the thyroid cartilage, *tilts the cricoid* and thus makes tense the vocal bands. A central lesion or one of the vagus above the origin of the superior laryngeal nerve must impair sensation as well as motion on the side involved, and, of course, affects the action of the crico-thyroid (or thyro-cricoid) muscle.

The following case, which was seen by several specialists here and abroad, and recently under the care of Dr. Duel and myself, offered peculiar problems and gave rise to more or less difference of opinion. The attacks of dyspnea were so alarming, and the space between the bands so contracted that one observer urged immediate tracheotomy, which, no doubt, would have been done but for the resistance of the patient, who preferred death from asphyxia to wearing a tube. Up to the present time the result seems to have justified his decision.

The patient is a man of middle age, of good constitution and of rather nervous temperament. In childhood he was inclined to be choreic and has always been neurotic. He is moderate in his habits, but has been subjected to excessive nervous strain from various causes. He admits excess in alcohol for a year, about four years ago. He had excellent health until six years ago, when he had an attack of ptomaine poisoning. For a year following he suffered increasingly from tachycardia, dyspnea and vertigo, which had been present more or less for a long time previously. Soon after he developed sciatica, which was pronounced by one physician who examined him to be a precursor of tabes. A recent careful examina-

tion by an eminent neurologist discovered nothing to sustain the suspicion. It cannot be learned what, if any, other grounds for the opinion then existed. About six years ago he contracted a chancre, which was followed by mild secondary symptoms, a few spots on the body and very slight and transient ulcerations in the throat. Specific treatment seems to have been carried out with care and thoroughness.

Nearly a year ago he was for the first time awakened one night from sleep struggling for breath. The dyspnea gradually subsided in a few minutes, but left him in a state of extreme mental agitation and greatly alarmed his friends. In the middle of last summer, after running for a train, he had the first day attack of laryngeal spasm. During the last six months there have been twelve or fourteen repetitions, varying in severity and duration, and all but one or two coming on in sleep. Usually they occur in the early morning and are often attended by a dream of choking. Sometimes the attack is observed to follow exertion, excitement, or exposure to local irritation, but often no such relation can be fixed. Under ordinary conditions nothing unusual is noticeable, but after exercise there is marked inspiratory stridor. Breathing in sleep is said to be excessively noisy. The voice is strong, although, perhaps, a little rougher than natural.

The picture in the laryngoscopic mirror is typical of bilateral paralysis of the abductors. The rima glottidis is converted into an antero-posterior slit. The vocal bands recede slightly on expiration, while on phonation they seem to be in perfectly normal position. There is a moderate grade of catarrhal laryngitis. In fact, the mucous membrane of the upper air tract generally is very relaxed and the uvula is extremely elongated. There is pronounced hyperesthesia of the pharynx and larynx. General condition is fair, but the patient is naturally perturbed by his strangling experiences, and by what he has been told. The urine is slightly albuminous and contains a few hyaline casts.

In view of the specific history and the patient's aversion to tracheotomy, it was determined to keep him under close watch and try the effect of medication. Inhalations of mentholized oil, 1/40 gr. of strychnia three times a day, and increasing doses of potassium iodide comprised the treatment, and at the same time the patient was directed to rest much and talk little. The redundant uvula was excised after local irritation had been subdued. At first the iodide was rather disturbing, but by gradually increasing the dose it was possible in three weeks to reach a maximum of 180 grains in three

doses in twenty-four hours. A single application of percutaneous faradism seemed to aggravate the condition and was not repeated. Under this regime there was manifest increase in space between the vocal bands and increased motility. This improvement has been maintained and the laryngeal attacks have decreased in frequency and severity. Further gain has been perceptible since suspension of all treatment some weeks ago. The movements of the vocal bands are still far from normal, but there seems to be ample breathing space and no reason to apprehend trouble. The patient himself volunteers the opinion that the whole disturbance is functional and independent of specific infection. It is certainly clear that the paroxysms are induced by mental perturbation rather than by physical exercise. For example, the most recent and a rather violent one followed a day of extraordinary mental strain in a law court.

In studying this case the various modes of meeting the situation came up for discussion.

Four methods of dealing surgically with bilateral abductor paralysis have been proposed: (1) intubation, (2) ablation of the soft parts lining the voice box, (3) division or resection of the inferior laryngeal nerve, (4) tracheotomy. My experience is limited to the first and last. In the single case in which I resorted to intubation, one of bilateral paralysis in a young woman following extirpation of a goitre, the presence of the tube became so irksome after a few days that the patient insisted upon its replacement by a tracheal canula.

Removal of the crippled vocal bands through a thyrotomy wound is an expedient that relieves stenosis, but destroys the voice. It is to be thought of, if ever, only in desperate cases in which there is no possibility of improvement, a conclusion to be rarely adopted.

On theoretical grounds the ideal procedure is resection of one recurrent nerve, whereby the corresponding band is placed in the *pathologic cadaveric* position, and the voice is finally regained through compensating action of the adductors of the opposite side. No record of this having been successfully done is accessible. Practically it is found that *shortening* of the adductors results from long contraction without antagonism so that the band still keeps a median position. (A. Cahn, *Deutsche Arch. f. Klin. Med.*, Feb. 22, 1903.) It is possible that in some cases a portion of the innervation of the adductors is derived from the nerve of the opposite side, and in addition there may be more or less ankylosis of the crico-arytenoid joint. For these reasons division of the nerve is a failure.

Tracheotomy then remains the operation of choice, especially if the patient is to be beyond means of relief in case of urgent dyspnea. It is best done under local anesthesia. The rapidity of asphyxia in some of these cases is astounding. To my knowledge in one instance a patient left the office of his physician with apparently sufficient breathing space and fell dead on the sidewalk, presumably from apnea, after having walked only a few blocks. On the other hand, most unexpected improvement has now and again been observed when the conditions seemed very unpromising. A case in point is recorded by Glasgow in the third volume of our Transactions, in which complete recovery of one of the disabled vocal bands took place after the lapse of several years. In the same volume Sajous reports a case due to lead poisoning in which recovery took place in the course of nine weeks under potassium iodide and nux vomica. More recently a case has been reported by G. L. Richards (*Journ. of Laryngol., Rhinol. and Otol.*, Oct. and Nov., 1906), in a child two and a half years old. The stenosis came on after a succession of frights, became worse, and in about two months a tracheotomy was required. The tube was worn for three months, and then gradually withdrawn without return of symptoms.

The prognosis in abductor paralysis is less hopeless than is generally believed. Spontaneous recovery, improvement under medication, or a temporary tracheal canula, depending on the cause of the lesion, are among the possibilities. In a large proportion of cases a permanent tube is the only alternative, but if the patient can be kept within reach it is well to postpone this measure until all other resources have been exhausted. On general principles in a case of long standing there is less likelihood of restoration of function owing to degenerative changes in the posterior crico-arytenoid muscle, as well as fixation of the crico-arytenoid joint from protracted disuse.

147 W. 57th St.

REPORT OF A CASE OF EPITHELIOMA OF THE LARYNX; REMOVAL BY THYROTOMY, AND NO RECURRENCE AFTER THREE AND ONE-HALF YEARS.*

BY HENRY L. SWAIN, M. D., NEW HAVEN, CONN.

Believing, as I do, that every case of radical operation for cancer of the larynx with its results, should be reported and recorded in some accessible volume, I hereby present the simple clinical history of an interesting case. Inasmuch as it is a favorable report, I have waited until a sufficient time has elapsed to insure no return before bringing it to your attention. The tendency in recent years is to lengthen the period of complete immunity before placing a given case in the "completely cured" list. Instances have been reported where recurrences have taken place after two years of apparent freedom, and very frequently after one year. In waiting three and one-half years, I feel that should anything ever show in the larynx of the person whose history I am about to report, it must be considered as a new involvement; certainly in no sense connected with the old one.

Mr. Blank, a clergyman of the age of 47, consulted me on the 23rd of March, 1903, complaining of hoarseness which had been annoying him during the whole winter; but during the last few weeks, so great had it become, that he had been compelled to relinquish all public speaking.

His history was a negative one, except that he had used his voice in his professional work freely and without stint. During twenty-five years of active pastoral work nothing has troubled him about his throat. His general health had been good. The family history was negative as regards any predisposition to tumor growths.

Examination showed a very healthy appearing neck and throat. Some slight naso-pharyngitis was present; otherwise nothing abnormal about the nose and throat until the larynx was reached. Here one found on first examination the right vocal cord and arytenoid normal in contour and slightly congested as was the whole interior of the larynx. The whole left half of the larynx seemed much swollen and no clear view of the vocal cord could be obtained, it being obscured by the left false cord.

I made no definite opinion at this interview, and prescribed simple inhalations of oleum pini silvestris.

* Read before the Twenty-ninth Annual Congress of the American Laryngological Association, Washington, D. C., May 7, 8 and 9, 1907.

In a couple of weeks the swelling of the false vocal cord had diminished, and one could plainly make out as the congestion disappeared a white papillomatous mass which grew from the upper aspect of the cord and apparently came out of Morgan's ventricle. But little of the cord was visible, as the growth covered nearly the whole length. During the next few weeks, while the larynx seemed to be improving in a general way, the patient was educated so that he became very tolerant of manipulation.

It being my firm conviction that too much instrumentation is extremely bad for any growth in the larynx at the age of a patient of his years, I deferred doing any cutting operation until I was sure I could do it well. During all this period of three or four weeks the patient was directed to speak only in very subdued tones, and was to do no public speaking whatever.

Finally, late in April, a prolonged session resulted in complete removal of all visible portions of the growth, which was friable and came away only in small pieces. Some of these were subjected to microscopical examination, which was indefinite in its results; a soft papillomatous mass which presented no epithelial nests and only a suspected activity in the cells as shown by very doubtful mitosis. Following the operation the patient had no great pain. The vocal cord was freely movable, and there was no evidence of glandular activity in the neck.

The growth promptly recurred, and at the end of June was again thoroughly cleared out. The microscope showed the same doubtful condition as before. At this time the ventricle was cleaned out as well as possible and the whole surface cauterized with pure nitrate of silver fused on a probe. Considerable reaction followed, but quickly subsided, and as soon as the growth showed any sign of recurring, as it subsequently did, it was promptly cauterized with the pure stick. This was done perhaps five times in the following two months, but failed in the end to restrain the growth, although apparently very effective at first.

In September it became apparent that something more radical should be done if the patient was ever to use his voice again. Accordingly, in the last week of that month he was sent, with both microscopical preparations, to Dr. Jonathan Wright for examination and advice. Dr. Wright reported that when he looked at the specimens he was inclined to believe it benign. When he looked at the larynx, however, he was placed very much in doubt. In such a case where the growth was so broad of base he felt that he ought to advise removal through external incision.

This being my own view, and the patient acquiescing, on the 10th of October Professor William H. Carmalt did a thyrotomy, beginning with the usual ether narcosis. A simple incision down to the isthmus of the thyroid; tracheotomy just above it; anesthesia with chloroform for the rest of the operation. The larynx was split open in the usual manner. Once this was done there was not the slightest room for doubt as to the expediency of the operation. Quite a large mass of tissue was removed with forceps and scissors. To do this thoroughly it was necessary not to spare either the false or true cords. Perichondrium seemed perfectly healthy. After stanching the bleeding with hot sponges, every suspicious area was thoroughly cauterized with the Paquelin cautery. By this means also all the bleeding except the merest oozing was stopped. The perichondrium and thyroid cartilage were sewed together, the tracheotomy tube removed, and the whole wound stitched up, leaving a small drain at the bottom.

The patient was put to bed with the feet slightly raised, and passed a fairly comfortable night. Except for a most profuse bronchorrhagia which at first relieved the excessive dryness of the early night, and which continued with great violence for the first three days, and then suddenly ceased, there was an uneventful recovery. The temperature never went above 100.2° , which was on the third day. One stitch toward the bottom of the incision below the level of the cricoid ring became infected. This later discharged considerable matter, and finally a sinus developed which ran between the skin and the anterior wall of the larynx, and a probe after passing up three-fourths of an inch entered the larynx exactly at the anterior commissure of the vocal cord. This proved very annoying and tedious, at one time quite concerning us as to whether in the granulation tissue which developed cancer cells might not be in evidence. Early in December it finally healed up in response to very urgent measures, and since then the patient has had no trouble whatever either with his larynx or with the wound.

During the first three days he was nourished by the rectum, and larynx completely healed over. At the end of the first week a slough or scab came off, and from that time on the interior of the larynx was free from all symptoms.

He had no trouble in breathing except the first night, when the sticky mucus which preceded the bronchorrhea greatly annoyed him, although at no time was there the slightest distress for lack of breath, the annoyance consisting more in the pain which was caused by the coughing of the sticky mucus from the wounded surface.

During the first three days he was nourished by the rectum, and after the first twelve hours was allowed to suck ice and swallow sterile water in small amounts. The pain on swallowing was severe on the second and third days owing to the motion of the larynx in the wound, but this diminished gradually thereafter.

Examination of the growth showed undoubted epithelial nests and in the lower layers marked cell activity with multinucleation of the cells, leaving no doubt as to the diagnosis. No attempt was made at the time of the operation to remove any of the lymph glands, as there was not the slightest evidence of any involvement.

Since February, 1904, the patient has spoken in a perfectly audible but slightly husky voice; at the present time the huskiness is hardly noticeable. At my suggestion, he has entered into editorial and other duties which require little or no use of his voice. Now he can speak loud enough to fill a large audience room, but he does not attempt it.

A fairly good presentment of the vocal cord has been produced in the shape of a dense white band where the true cord should be and of which it is probably a part. The false cord is flatter than normal, and Morgan's ventricle practically eliminated. I have seen him within a month, he having made the journey to me in order to make this report complete, and his larynx is in absolutely perfect condition.

By way of comment upon the case, it may not be amiss to emphasize these facts:

The ever present difficulty in coming to a diagnosis.

The wisdom, even when in doubt, of operating in a way to insure complete removal.

The oft repeated observation of the surprising differences in the appearance of the growth when the larynx is open.

The impossibility of being sure you have removed everything malignant; hence the wisdom of the use of the Paquelin cautery.

The possibility, when the larynx is roomy, of shutting up the whole wound instead of leaving the tracheotomy tube in place.

The unquestionable advantage of an absolutely recumbent position with the feet raised, during the first days following the operation.

And finally, that when you have an intelligent, brave and tractable patient, how small the suffering seems as compared to the mercy of a complete cure.

232 York St.

PHYSIOGNOMY AND ITS RELATION TO THE SIZE AND EXTENT OF THE SINUS FRONTALIS.

BY H. J. H. HOEVE, M. D., DES MOINES, IOWA.

Our attention is called by Macalister to the fact that the development of the frontal sinuses is intimately connected with the development of the teeth, the extension of the superior maxilla and the protrusion of the facebones, in fact the outer table of the frontal bone separates from the inner at the location of the future sinus, about the period of second dentition.

At about the twentieth year, the sinuses are supposed to have reached their full development. (Treves, Combe.) According to the same men, large sinuses are mostly found after the twentieth year, and it certainly can not be doubted but that there is an enormous increase in the size of the frontal sinuses about this time, which is in a great many cases easily noted by the decided change which takes place in the lower frontal region of the head, a change which gives the face a stronger and more mature expression and which is partly brought about by the internal extremities of the superciliary ridges becoming more prominent.

I have shown that the development of the frontal sinus is in close relation to the general proportional makeup of man and that they differ very much in size and extent, according to the temperament which the man possesses. It is, of course, impossible to describe a distinct type of frontal sinus for every shade of the mixed temperaments which present themselves everywhere to the observing eye, but for our purposes it is better to follow the anatomical classification of temperaments as given by Dr. Jacques, the Motor, Vital and Mental. In the mixed temperaments, mostly one or the other predominates and for our purposes, we may classify them also according to the characteristic which predominates into the Motor, Vital and Mental.

The Motor Temperament.—This is the easiest one to recognize, for it can be seen at once that the bony framework and the musculature is developed at the expense of the rest of the body. It is correspondingly found more frequently in man. Men of this type are generally tall, have broad shoulders and a more striking than elegant figure. Adipose tissue is decidedly lacking and correspond-

ingly we find that the joints are quite prominent. The neck is rather long, but the muscles stand out powerfully when contracted. The face is frequently oblong or angular in form, the front teeth are mostly large and have a yellowish hue. The lower jaw is always massive and frequently square, what Woolsey would call a prizefighter's jaw. (The shape of the jaw differs according to the admixture of other temperaments.) The malar bones are more prominent and higher than in other types. The thorax is well developed, the hands are long and have a powerful grasp. The physiognomy gives the impression of being earnest, determined or stern.

The Forehead of the Motor Temperament.—The forehead is generally slightly retreating and is never very high, this is mainly due to the parietal bones bulging out in these types much farther than in others. In short, the motor region of the brain is developed at the expense of the upper part of the frontal and the occipital lobes. The superciliary ridges are very prominent, but not the entire ridges, the internal parts of those which bound the glabella laterally being the most prominent. These ridges are not as smooth in outline as in the other types, but in fact the only part which is well developed is the internal part, which has the appearance in these cases of a rough, bony protuberance.

The interfrontal region seems to form two arches, which extend from the prominent portion of bone between the superciliary ridges, a long one, upward to the moderately developed coronal region with its concavity forward and, a short one, downward to the naso-frontal suture, also with its concavity forward. The region above and between the superciliary ridges, glabella is mostly well defined, on account of the internal extremities of the superciliary ridges being so prominent, but this region is never as large as in a mental or vital type.

The Transverse Naso-Frontal Line of the Motor Temperament.—It corresponds to the topography of the naso-frontal suture. A well marked transverse naso-frontal line, that is one, which forms a distinct retreating angle between the upper part of the nasal bones and the prominent internal extremities of the superciliary ridges, being buried between and just below the prominent internal parts, indicates the absence or smallness of the lateral or the presence of the internal set of frontal sinuses.

The Vital Temperament.—The Vital type is characterized by a body taller but much wider and limbs much shorter than the motor type. This type is found much more frequently among women

than among men. The face is round and has a frank and pleasing expression, the nostrils are wide, the neck is short and thick and the shoulders are broad but nicely rounded. The chest is full and the abdomen is well developed. The arms and legs are plump, but tapering, and the hands and feet are very small. The head is round.

The Forehead of the Vital Temperament.—This is not slanting as in a motor type, but bulging forward. In a great many cases there is a well developed intersuperciliary region, but here it is not due to the prominent internal portions of the superciliary ridges, but in a great many cases we find here an enormous breadth between the eyes, and the entire inferior region of the forehead between the external angular processes of the frontal bones may be nicely rounded so as to present a convexity forward, without the slightest elevation indicating the location of the superciliary ridges. Sometimes the internal part of the ridges is prominent, but here we do not find the sharp rough protuberance at the internal extremities of the ridges as in the motor type, but rather an extensive bulging of this region, and whenever the lower part of the forehead presents this peculiarity in a vital type, you can be sure to find very large and extensive sinuses. In these cases the lower frontal region is convex from one external angular process of the frontal bone to the other. The forehead is gracefully rounded and presents a curve with its convexity forward, extending from the coronal region where the hair begins to the nasion, in fact it can be said, that this curve forms a part of a circle, which has its center just between the apices of the orbits. The forehead is frequently rapidly slanting backward and upward from a point about one-half inch below the line where the hair begins.

The Transverse Naso-Frontal Line of the Vital Temperament.—In this type, it seems to form a sharp transverse cut at the root of the nose, on account of the lower region of the forehead, from one external angular process of the frontal bone to the other forming a smooth arch, which is pushed forward in such a way, as to overhang the root of the nose. The line is not altered materially in those cases of vital types, which have nicely marked superciliary ridges, and which consequently have the largest sinuses.

The Mental Temperament.—This type is also very frequent in women. The most distinguishing feature is the frail body, as compared with the size of the head. The head is large, the face oval

and the features delicately cut, but most sharply outlined. The teeth are bluish and the muscles well developed, but not large. The hands are slender and tapering and the fingers long, in fact, the entire appearance shows that all the structures of the body are delicately molded, according to a very sensitive nervous system.

The Forehead of the Mental Temperament.—It is mostly high and has a pale color. The lower part is not very prominent on account of the coronal region being better developed. If the superciliary ridges are plainly visible as generally in these cases, then they present a nice and even contour. They are about as well marked at their outer as at their inner extremities and are not rough like the ones of the motor type.

The Transverse Naso-Frontal Line of the Mental Temperament.—In this type, the naso-frontal line is not very prominent, on account of the forehead and the dorsal surface of the nose forming a much greater angle than in the motor type, in fact the sharp angle between the upper border of the nasal bones and the internal extremities of the superciliary ridges seems to be filled in with bone and the entire transverse naso-frontal line seems to be carried downward and forward. (Of course the degree of slanting of the forehead must be taken into account.)

QUALITY OF THE FRONTAL BONES IN THE DIFFERENT TEMPERAMENTS.

Motor type.—Course and heavy bones. Thick skulls. Frequently a large amount of diploe present between the frontal sinus and the external plate of the frontal bone. The bone is not as dense as in the mental type.

Vital type.—Thin, frail bones. Skulls thin and brittle. The anterior wall of the frontal sinus frequently fused with the external plate of the os frontalis.

Mental type.—Delicate, strong and very dense bones. Skulls of medium thickness. Diploe frequently present between the sac of the sinus and the external plate of the os frontalis.

Size of the Sinus Frontalis in the Motor Temperament.—In this temperament the sinus is very small or absent. This is the type, we must look out for Trephining in the region of the frontal sinuses in such a case, would mean, in at least 60% of them, the same as opening the cranial cavity.

Size of the Sinus Frontalis in the Vital Temperament.—In this type, you always find a large sinus, which extends well outward. If the superciliary ridges are prominent even in their smallest details, in this type, you can expect to find sinuses which are very large, which extend well outward and upward and the lowest point of which is mostly the upper opening of the infundibulum.

Size of the Sinus Frontalis in the Mental Temperament.—In these cases the sinuses are frequently of the average size, which is given by Sir Logan Turner in his article on the frontal sinuses, in the *Edinburg Medical Journal* of May, 1898. (Height, 31 mm. from the upper opening of the infundibulum vertically upward; breadth, 30 mm. from the median septum horizontally outward; depth, 17 mm. from the anterior wall at a level of the fronto-nasal suture backward along the orbital roof.) Of course, what he states about the sinuses never being symmetrical is true, but in the mental type we find sinuses which come closest to what could be called symmetrical.

Instrumental Diagnostic Methods.—Even though it does not belong to this paper, to mention or discuss instrumental diagnostic methods, I must mention Sir Logan Turner's important method of transillumination in case of the frontal sinuses, the technic of which is familiar to you all. I believe that every case of empyema of the frontal sinus or sinuses, should be carefully examined by this method before an operation is decided upon, and then if it should seem necessary to open the sinus or sinuses, this same method should be used as one of the important aids in the deductive diagnosis, as to the size and extension of the involved sinus or sinuses. By following this method exactly, the electric bulb with its short tube will be placed about 17 mm. to one side of the middle of the nose at its root. This would be above the internal canthus of the eye, in fact just behind and inferior to the internal angle of the frontal bone. Sir Logan Turner is correct in calling this the thinnest place of the entire sinus, but even if the electric bulb should be applied still farther backward, I do not believe that it is possible in every case, to make a diagnosis of the presence of the large accessory sinus, which is so frequently located behind the sinus proper. I should like to again call attention to the cuts in Dr. Cryers paper on the frontal sinuses of January 26, 1907, in the *American Medical Journal*, which verify some of the facts mentioned in this paper.

After having completed this paper, I became acquainted with Dr. E. Zuckerkandle's *Anatomie der Nasenhöhle*, 2nd edition, Vol. 1, 1893, and I am very glad, indeed, to see that one of my main observations coincides with what he states on page 325: "However, it should be noted that when the sinus frontalis is very large, not only the eyebrows, but also the supraorbital region as a whole is prominent, but when the sinus is lacking the prominence is usually limited almost to the arcus supraciliares."

The first variety he mentions is undoubtedly the second variety of the vital type, mentioned in this paper, in which the entire lower forehead is convex from side to side, and in which the superciliary ridges are prominent and nicely marked. The second variety he mentions is in all probability a motor type, in which the internal extremities of the superciliary ridges are very prominent.

1505 W. 9th St.

Congenital Deafmutism. JOH. HABERMANN. *Arch. f. Ohrenh.*,
Leipzig, Dec. 1904.

Female, 44 years old; congenital deaf-mute; cause of death, pernicious anaemia. The pathological findings, which were essentially alike in both ears, were as follows:

Hypertrophy of the mucous membrane of the middle ear. Adhesions between the head of the malleolus and the roof of the tympanum. Exostoses of the inner wall. Thickening of the base of the stapes, and fibrous and bony ankylosis of the stapes. Atrophy of the nerves of the cochlea and ossicle, hypoplasia of the organ of Corti, and various anomalies of the structures in the turns of the cochlea.

YANKAUER.

A CASE OF CLOSED SINUSITIS OF THE ETHMOID LABYRINTH, WITH EXOPHTHALMOS.*

BY HARRY KAHN, M.D., AND MORTIMER FRANK, M.D., CHICAGO.

F. G., a school girl of fourteen years, who gives the following history: Father died of tuberculosis; the mother and two brothers in good health.

The patient, during the year of 1904, suffered successively with measles, scarlet fever and diphtheria. In 1905 she had chickenpox, and in 1906 an attack of mumps. Following the attack of chickenpox the patient noted a protrusion of the left eye, which, as time progressed, became more and more prominent. There was no headache, no hydrorrhea, no parosmia, no pharyngeal or laryngeal irritation; in a word, there was no symptom of the subjective variety that could be referred to the nose or to the accessory sinuses.

The *ophthalmological examination* presents nothing of importance except the exophthalmos. The globe was pushed outwards, forwards, and to the outer side of the orbit. On palpation, could be felt the sharp posterior edge of the lachrimal bone, which was driven forwards. Vision, 6/7, and with a $+0.50 = +0.75 \times 90$, 6/6. The *ophthalmoscopic examination* was negative. There was no diplopia, and ocular movements free in all directions. Lids in perfect apposition. Tension normal, and no tenderness or pain on pressure.

Rhinoscopic Examination. The septum is almost straight. The right side of the nose is normal. The left showed a large tumor-like mass, polypoid in character, in the place of the normal anterior end of the middle turbinate body; it filled the whole of the olfactory space, lying flatly against the septum on the one side, and impinging on the external wall on the other.

After the application of adrenalin and cocaine the mass did not shrink, was hard and immovable when tested with the probe, hence a bullous anterior end of the middle turbinate was diagnosed. No pus was visible in the nose at any time, nor did the patient give any history of a purulent discharge; in fact, she stoutly denied ever having had any such discharge.

The anterior end of the middle turbinate was resected with the scissors and the snare. There immediately escaped a large volume of white, odorless pus, which has continued to discharge to a greater or lesser degree ever since the operation, on the 17th of January,

* Read before the Chicago Laryngological and Otological Society, February 19, 1907.

1907. The ethmoid labyrinth was cleaned as well as possible at the time. An opening was made, large enough to insure good drainage. The progress of the case has been very satisfactory. The discharge of pus is gradually becoming less, and the eye is returning to its normal position.

This is a case of true closed, or, as the Germans name them, "locked," ethmoid sinuitis, with a perforation of the lamina papyracea. That this is the diagnosis is shown by the results of the operation, namely, the finding of pus in spite of the absence of symptoms pointing to its existence, and the return of the eye to its normal position in so short a time after the operation, argues for a perforation of the lamina papyracea.



Case of Closed Sinusitis of the Ethmoid Labyrinth with Exophthalmos.

The case is presented, not because we believe this condition is an extremely rare one, but we do think that this is an uncommon case, and, further, the case is now of two years' duration. During that time, it has been seen by several of our colleagues, by whom various diagnoses were offered, such as osteoma of the orbit, tumor of the orbit, etc. One practitioner sent the patient to a hospital for enucleation of the eye, but at the last moment she rebelled and left the hospital.

That the enucleation of an eye is not so uncommon, we need but to refer to the recent paper by Fish (Medical Record, vol. 70, page 689), in which he reports five cases of enucleation of the eye in patients suffering from a closed ethmoid sinuitis. From this case, and those reported by the last-named author, warning should be taken by the ophthalmologist not to enucleate an eye of this type without first looking into the nasal condition.

THE ALVEOLAR ROUTE OF OPERATING UPON THE MAXILLARY SINUS.

BY MELVILLE BLACK, M. D., DENVER.

This article is prompted by the article of Dr. Walter A. Wells, in the December number of this journal. This gentleman is evidently so prejudiced against the alveolar operation that he fails to give it even scant justice.

Dr. Wells considers the operation through the alveolus unjustified for many reasons, but the natural inference is because he considers it an operation which does not cure. He seems to think that it is confined to making an opening into the antrum through a tooth cavity, and putting in a drainage tube or plug to maintain the patency of the opening; that the antrum can not be curetted through the opening, nor satisfactorily treated; that the opening will close before suppuration has ceased, unless kept open by a tube. He also objects to the communication with the mouth, because of the possibilities of food getting into the antrum. In short, he classes this operation as "tentative and conservative," and that it "has no justification whatsoever."

I desire to take issue with every objection he has made to the alveolar operation. I do not desire to criticise the operation advocated by Dr. Wells. It is a well known and meritorious procedure. His method of making an opening through the naso-antral wall is the only part, I presume, for which he claims originality. His cutting-rasp-trocar is an ingenious instrument. I shall certainly get one and give it a trial, as I fully realize that the nasal route is in some cases more satisfactory than the alveolar route; it involves the sacrifice, however, of one-half of the inferior turbinated body. It mutilates, to a certain extent, the nasal interior, and in my opinion is not a justifiable procedure as a primary operation, if the alveolar opening can be made without the sacrifice of a good tooth.

Now for the alveolar operation, as I perform it. I always select one of three tooth sockets, the second bicuspid or the first or second molar. If one of these teeth is out, this space is used. If no one of them is out, I select the one most diseased. The opening into the antrum should be made as large as the space between the teeth will permit, unless several teeth are out. In this event, the opening

should have an all round diameter of three-eighths of an inch. The primary opening should be made with a quarter-inch trephine, and this opening enlarged with a burr. Before enlarging the opening with the burr, it is well to clear the antrum of all its pus by springing. If only one tooth is out the opening should be enlarged laterally until the opening of three-eighths of an inch in its greatest diameter is made. Its other diameter is governed by the distance between the teeth. The antrum should now be freed of all blood by syringing or irrigation, then cocain and adrenalin springed into it. A Miles' curette is now introduced, with its shank so bent that all the walls of the antrum can be reached and the cavity thoroughly curetted. Springing or irrigation is again practised until all debris is washed away, when the opening is packed with gauze and the patient is then sent to a dentist, that he may take an impression of the part and make for him a small saddle-shaped plate or bridge, which fits over the alveolar process, and covers the hole, and clasps the teeth in front and behind for its support. If the patient is wearing a plate which covers the part, this is all that is required. This saddle-bridge can be made of rubber, gold, silver or aluminum. It is easily removed and replaced by the patient. Until the dentist has made this bridge, I see the patient daily and syringe out the cavity with some antiseptic wash, and repack the opening with gauze. After he gets the bridge I cauterize the whole interior of the antrum with pure carbolic acid applied with cotton wound upon cotton carriers, suitably bent to reach the antral walls, and then immediately neutralize the acid by syringing alcohol into the antrum. The patient is now taught how to cleanse the cavity. I see him at weekly intervals and apply the carbolic acid. The opening will begin to grow so small by the third week that it must be enlarged. This is very simple. Cocaine is applied in the opening as well as adrenaline, and with a cataract knife the bony opening is reamed out. A collar of tissue comes away quite easily if the precaution is taken to introduce the point of the knife well up into the antrum. In this manner the opening can be maintained large enough for all purposes of treatment until the case is well. I have not had a single case in the last ten years which has exceeded four months' treatment, and very few go beyond six weeks; many of these cases have had chronic empyema of the antrum for years. Many of these antra have contained large amounts of granulation tissue, and some of them dead bone. I had all kinds of trouble as long as I used tubes. I do not believe the alveolar operation will ever be popular as long as tubes are used. I am satisfied that their use has been largely responsible

for the disfavor in which many hold this operation. They interfere with perfect drainage and they promote the formation of granulation tissue in the antrum about the end of the tube, which may keep the disease going indefinitely. In short, they act as foreign bodies, and as a splendid canal through which food and mouth secretions pass to the antrum. I discontinued using them ten years ago and at once my cases began to get well in a much shorter time than ever before.

When I began using carbolic acid another gain was made. So far as the douching agents are concerned, I am indifferent, so long as they cleanse the part. This operation with me is successful. If it were not I should not continue to use it. The disease rarely recurs. When it does, even though the hole is firmly closed with tissue, I ream it out with a cataract knife, have them wear the bridge again, and proceed with the carbolic acid, cleansing and curetting if necessary. In a few weeks they are well. I object to hearing this operation through the alveolus slandered. There are, no doubt, more radical operations, but in my opinion they are not indicated unless the patient's teeth are all sound. I am not sure but that I should prefer to lose one of my teeth rather than one-half of my interior turbinate.

Majestic Building.

Anosmia, Parosmia and Parageusi. C. ZIEM. *Monatschr. f. Ohrenh.*, Berlin, Sept., 1904.

The author describes the disturbances of taste and smell associated with suppuration in the maxillary sinus, and recites histories of cases in which these disturbances were relieved when the sinus affection was treated.

YANKAUER.

SUPPURATION IN THE ETHMOID AND SPHENOID SINUSES WITH PARALYSIS OF THE THIRD NERVE. CASE REPORTS.

BY JOHN A. THOMPSON, M. D., CINCINNATI, OHIO.

CASE 1. Mrs. S——, aged 40, American, housewife, was admitted to the private service of Dr. J. C. Oliver at Christ's Hospital, September 29th, 1906. She is an unusually robust woman. She had been perfectly well until three weeks before admission. At that time she had a very severe and sudden attack of pain over the left eye and left temple extending later to the back of the head. At night the pain disappeared and she was well for one week. While at breakfast a week after the first attack, the pain returned suddenly and she was nauseated and became speechless. This severe pain lasted only a short time and was succeeded by a dull ache. The following day the pain still remained and the left eyelid began to droop. The next day vision was impaired. The first and second attacks of pain occurred on Sunday. The Wednesday following the second attack she consulted her family physician about the continuing headache and the drooping of the left eyelid. While in the doctor's office the pain came on again, first in the eye and temple and then extending over the whole head. It was so severe she lost consciousness. From that time until she came to Christ's Hospital to the service of Dr. J. C. Oliver she was confined to her bed; suffering intensely. When admitted the left eyelid was paralyzed, the pupil dilated and there was only slight movement of the eyeball. The temperature was usually normal and never went above 99.4°. She was given Asperin, grs. v, every four hours, and codein to relieve the intense pain. First an ice cap and later hot water bottles were tried for relief of the pain, with little benefit. She was given four mercurial inunctions before I saw her and took potassium iodide about three weeks. At Dr. Oliver's request, Dr. C. W. Tange-man saw her October 4th. His report is as follows:

"The eyelids: On the left side I found the eyelid drooping, complete ptosis; on the right side normal.

Eyeball: Left eye, normal in appearance, no redness, all the media clear, transparent; right side, normal.

Pupil: Left eye, widely dilated, did not re-act to light; right side, normal, re-acted to light and to all the different tests.

Movements of the eyeball: Left side, there was complete paralysis of the third nerve, the eye deviating externally; right side, normal. No pain whatever in the left orbit on attempt to move the eyeball.

Field of vision, as nearly as could be tested, was below the normal on the left side, a little better on the right side. (Could not be well tested because the patient was in a recumbent position.)

Range of vision: Left side, required a corrected glass of 2. + diopters. Right side, normal.

The fundus: Left side, a distinct choked disc and swollen nerve so that the vessels were partially covered, with a hemorrhage on the nasal side. Right side, some disturbance of this same character, but not to so great an extent.

History absolutely negative. No rheumatism, no specific trouble, no malaria. I saw her at two or three different times, conditions unvarying."

I saw this patient October 13th at Dr. Oliver's request. She was very nervous and unmanageable, having had little sleep for three weeks as the pain was so severe. Examination of the nose showed some necrosis of the right middle turbinated bone. Examination of the left nostril was difficult as a large septal spur hid the upper portion of the cavity. I could recognize extensive disease of the left Ethmoid cells and probable suppuration in the sphenoidal sinus on the same side. Operation was advised and made October 15th under chloroform anesthesia. The spur was first sawed from the septum. The projecting diseased portion of the left middle turbinate was snared off. The ethmoid cells were thoroughly opened with forceps and curette until all the diseased bone was removed. So extensive was the necrosis that a large opening was made into the orbit. The anterior wall of the left sphenoidal sinus was then removed, leaving it freely open. The necrotic portion of the right ethmoid was then snared off and the wound curetted down to sound bone. The whole operation was done through the nostrils with no external wound. The patient was put to bed in good condition. There was a large extravasation of venous blood into the orbit which gave her a black eye for several weeks. The first noticeable effect of the operation was the relief of the severe pain. In forty-eight hours the patient was comfortable and sleeping better than she had done for weeks. One moderately severe attack of pain was caused by a blood clot clogging the opening of the sphenoid

sinus. She improved rapidly and left the hospital twelve days after the operation.

There was a slight reaction to light in the left pupil when she went home, but the other paralytic symptoms remained unchanged.

November 13th, her husband wrote me that her general health was good and she slept better than for ten years. December 28th, he wrote the eye was open, but with an external squint so she was much troubled by double vision. The eyeball could be moved voluntarily, but control was not perfect.

She was advised by letter to paste a piece of paper over the glass in front of the left eye and depend on monocular vision. January 5th, 1907, he reported her able to focus the eye.

The patient returned to the city late in January. The following is Dr. Tangemann's report of the ocular condition:

"Feb. 2nd. I saw this patient again. Vision, left eye, 20/30; right eye, 20/20. Still complains of some pain about one inch above orbital region on the left eye. There is still a slight amount of ptosis on the left side. (The lid seemed heavy, which possibly was the reason it lagged.) The paralysis of the third nerve has nearly disappeared—the pupil reacted to light and the movements were free in every direction but not fully restored, because it required a prism of 10° base up and in, to make her see single. The chief complaint was that she sees double."

The patient said to me she only saw double when she was tired.

One symptom spoken of by Dr. Tangeman while the case was under observation is not mentioned in his report. Accommodation remained while all other muscles supplied by the third nerve were completely paralyzed. It was on this symptom I based the favorable prognosis given in the case.

Examination of the nose showed perfect healing of all the operation wounds. The opening into the left sphenoid permitted free inspection of the sinus and the membrane appeared perfectly healthy.

In a short time recovery will be complete.

Several points in this case are notable. The extensive destruction of bone with no symptoms attributed to the nose is very uncommon. The case was under close observation in the hospital by careful and competent physicians for two weeks before it was thought advisable to call a rhinologist.

The severity of the pain, producing unconsciousness at one time, was more marked than usual, though the suffering of patients with suppuration in the accessory sinuses of the nose is generally extreme.

Finally the recovery from an apparently hopeless paralysis shows the possibilities of intranasal surgery.

CASE 2. Dr. C. E. R., of Lancaster, Ohio, was referred to me February 21, 1907, by Dr. C. W. Tangeman. He gave the following history: In October, 1906, he had an attack of la grippe with intense headache and some fever for about ten days. Near the end of this attack his vision became somewhat cloudy, and the outlines of objects seen were indistinct. When he awoke one morning he looked toward an adjacent house, where there were two windows, and he saw four. Since that time the double vision has been continuous. He has to wear an opaque glass before the right eye so that he can guide himself without running into objects, as he is unable to distinguish the apparent from the real one. There has been no pain nor headaches since this attack. He said he has had slight catarhal symptoms for several years, but nothing pronounced enough to require any treatment. He had previously worn glasses for astigmatism, but there had been nothing in the previous ocular examinations to direct attention to the nose. When he consulted Dr. Tangeman there was a marked divergent squint, the right eye being turned outward. There had previously been marked dilation of the pupil. Examination of the nose showed evidences of old atrophic rhinitis. On the right side the middle turbinate was much enlarged and was in contact with the septum. An opening into the anterior ethmoid cells was made at the first visit and a large amount of pus was evacuated. I did not attempt a complete operation at this time. One week later the doctor returned to the city and I removed practically all of the anterior ethmoid cells under cocaine anesthesia. He said the drainage of the pus a week before had resulted in marked improvement so the eye could be focused for near objects by a special effort. March 20th, this patient was seen again at my office. He had discarded his opaque glass before the right eye, as he was able to drive or walk without his vision of objects being confused. The only time he saw double was when he attempted to look at objects on his left side. The pupil was still slightly dilated. The nasal wound had healed except at one small point where a little carious bone required curetting. The extensive destruction of bone in this case with so little pain is unusual. The rapid recovery from the ocular paralysis is particularly gratifying.

628 Elm St.

THE RELATION OF TONSILLITIS TO RHEUMATISM.*

BY E. FLETCHER INGALS, M.D., CHICAGO.

One of the first references that I find to the relation of these two diseases was by Desmos, about 40 years ago. He stated that the poison of rheumatism occasionally favored the production of inflammation of the tonsils. The late Sir Morell Mackenzie, in 1880, endorsed this statement and some other authors since that time have accepted this view, but the majority of those writing upon diseases of the throat have not mentioned any connection between the two diseases. I was one of those who several years ago accepted the theory that rheumatism was a frequent cause of tonsillitis and I have seen some well marked cases that tended to confirm that belief; yet, during the past few years, I have unconsciously drifted into the opinion that the relation was only exceptional. In 1901, F. De Haviland Hall and Herbert Tilley wrote: "It is now almost universally agreed that there is an intimate connection between tonsillitis and acute rheumatism." It must be conceded that inflammation of the tonsils and acute rheumatism are sometimes associated and that the same causes occasionally seem to excite the two affections. Some authors go so far as to claim that the rheumatic poison, whatever it may be, practically always enters through the tonsils.

Dr. O. T. Freer, who examined the recent literature for me, has found a number of references to this subject, the most important of which are as follows:

In 1900, Woloshinsky¹ reported a house epidemic of nine cases of lacunar tonsillitis immediately following which three of the patients acquired rheumatism. He regarded polyarthrititis as secondary to inflammation of the tonsils, which he thought was produced by pyogenic germs. Frederick A. Packard² writing in 1900, states that during the course of an angina or following it the most important complication is acute articular rheumatism. He thinks rheumatism an infection due possibly to several varieties of bacteria. The rheumatism also, he thinks, may be caused by absorption of toxines. This appears to me the most common cause. He believes infection frequently occurs through the tonsils, more especially in connection with acute rheumatism.

* Read before a Joint Meeting of the Chicago Laryngological and Otological Society and the Chicago Medical Society, March 20, 1907.

In 1901, Julius Ullmann,³ expressed the view that the normal tonsil is a protection, but that the diseased tonsil is a source of infection, which may be the place of entrance for acute rheumatism, endocarditis and chorea.

In the same year St. Clair Thomson⁴ states that :“Probably 30 to 80% per cent of the cases of acute rheumatism are preceded by angina; though the relation of the two affections is not yet clear. The tonsil without visible change may be a source of entrance for infection.” An editorial in the *Jour. of the A. M. A.*, Jan 19, of the same year, entitled “The Tonsils as a Portal for Rheumatic Infection,” appeared to express the prevailing opinion on this subject at that time. It states: “Tonsils seem not only to be able to act as places of entrance for articular rheumatism but also for myocardial infection.”

Dr. W. Cheatham⁵ in the same year in an epitome of the subject of rheumatism as a cause and effect in inflammation of the throat, expresses similar views.

Gurich⁶ asserts his belief, founded upon clinical experience, that in many cases articular rheumatism follows chronic desquamative inflammation of the follicles of the tonsils. In supporting this view, he mentions a number of patients who for years suffered from numerous relapses of articular rheumatism that did not recur after treatment of the tonsils.

In 1905, Rottenbiller⁷, mentions 29 cases from his own practice in which polyarthritis followed follicular tonsillitis, and the same year Parmentier⁸ reports one case in a child, where rheumatism promptly followed the cessation of tonsillitis.

The subject is summed up as follows by Isaac Adler,⁹ who emphasizes the frequency of rheumatic infection through the tonsils. This infection need not appear as a follicular angina with fever, swelling of the tonsils, etc. On the contrary, a severe inflammatory reaction seems to act as a preventive of general infection. It is proven (by him) that very virulent bacilli may pass through the tonsils without local changes in them of reactive or inflammatory nature. The thin epithelium of the lacunae is most often injured and germs may pass through it and enter the lymphatic vessels. For this reason, a slight irritation of the tonsils may be the prelude to a more or less severe rheumatic or septic general infection. The author states that muscular rheumatism most often settles in the muscles of the neck, nape of neck and shoulder and that he is convinced that it has a

bacterial source. The acute beginning of these symptoms is nearly always preceded by tonsillitis. He thinks also that the tonsillar source of pneumonia is certain in many cases; and he regards desquamative nephritis, without oedema, vomiting or headache, or other subjective or objective symptoms except the findings in the urine, as in some way related to tonsillitis. He advises the extirpation of tonsils that show the least sign of disease. The most dangerous tonsils he deems the non-hypertrophied ones, with soft permeable tissue and open communication with the lymph passages, especially where there are epithelial changes in the crypts.

I can find no evidence in support of most of his views and certainly they do not agree with my personal observation.

I had gradually grown to think that there was no intimate relation between tonsillitis and rheumatism, but the request of our secretary that I present a paper on the subject caused me to have an examination made of the records in my office of my private patients. Dr. G. W. Mosher has carefully looked over my case books and from these records, which include the histories of 1393 different patients who came to me suffering with acute and chronic tonsillitis, the histories of 100 acute cases have been taken without selection. An analysis of these seems to give a fair idea of the conditions that would obtain in all. Without selection, excepting as to age and sex which seem to be determining factors in many cases, we took 100 other control records of patients coming to me with other diseases for the purpose of ascertaining as nearly as might be the frequency of rheumatism not associated with tonsillitis.

Statistics on the etiology of diseases are frequently misleading on account of the absence of control cases; for example, if in 100 cases suffering from tonsillitis, we should find that there were 50 who had suffered from rheumatism, the customary way would be to conclude that rheumatism was the cause of the disease in 50%; whereas if in the 100 control patients, without tonsillitis, we should find that 50 had suffered from rheumatism, it would appear that 50% of all patients suffer from rheumatism and that, therefore, there is no relation whatever between the angina and the arthritis.

An examination of our histories revealed some other points of interest aside from the question under consideration. For example, nearly all of the patients had indoor occupations and 70% were males. Interesting figures also appear regarding the ages of the patients affected. Only one was less than 10 years of age and only one was over 50; 7% were between the ages of 40 and 50; 11% between 10

and 20; 26% were from 30 to 40 and 54% were between the ages of 20 and 30 years.

An analysis regarding the character of the inflammation shows 48% were follicular, 35% parenchymatous, 11% suppurative and 3% were ulcerative. In 3, the character was not stated. In 35%, there had been no previous attacks. In 11%, the patients were subjects of chronic tonsillitis; 9% had suffered from one or two previous acute attacks and 45% had suffered several or many previous attacks. This analysis yields no definite results regarding exciting causes of the disease, although 30% were attributed to colds.

It was found from this analysis that 45% of my patients who were suffering with acute tonsillitis were having at the same time, or had had previously, or had immediately following, an attack of acute rheumatism; whereas only 16% of the control cases had been similarly affected. This would suggest that 29% of all cases of acute tonsillitis are closely associated with some form of rheumatism and that in this proportion inflammation of the tonsils appears to be due to the same causes as rheumatism. However, as the term "rheumatism," in this analysis, includes muscular rheumatism, there is a possibility that in some of these cases the muscular pain may have been due to other causes.

Of the 45%, in whom rheumatism and tonsillitis had been in some way associated, 26 had muscular rheumatism and 27 had articular rheumatism, some of these having had both varieties of the disease. Some had the rheumatism before the tonsillitis, some at the time, and part following the arthritis; while others had the attack at two or more of these times. This analysis shows that only 5% had acute rheumatism immediately before the tonsillitis, that during or immediately following the attack of tonsillitis 8% had muscular rheumatism, and that 8% at these times had articular rheumatism. Thus only 13% showed any very clear association with the latter disease for what was termed muscular rheumatism was possibly simply the aching due to the angina.

The figures appear to prove that 45% of all cases of acute tonsillitis are in some way associated with rheumatism; that 29% have more than an accidental relation and that at least 13% are so closely associated with the latter disease as to justify the hypothesis of an identical cause. However, we must admit that they do not disprove a like etiological relation in the other cases.

Guerich, already quoted, believed that the removal of diseased tonsils would, in some cases at least, prevent the return of attacks of

rheumatism, and Adler advises the extirpation of tonsils that show the least indication of disease, apparently for the same purpose. In all these cases of acute tonsillitis, my records only show 11% that were affected with chronic disease of these glands, therefore I cannot agree with Adler that all tonsils showing the slightest evidence of disease should be removed; but I do believe that tonsils that frequently become inflamed, or enough enlarged to interfere in any way with the normal functions of the throat, should be excised or cured.

From this analysis I conclude: First, that I have gradually fallen into error regarding the relation of tonsillitis and rheumatism and that what has appeared to me merely casual is in fact due to an identical cause for the two in from 13% to possibly 29% of all cases of acute tonsillitis.

Second, 45% of the cases of tonsillitis have a rheumatic history, but 16% of other affections of the throat and chest also have a rheumatic history, so that not more than 29% of the cases of acute tonsillitis can fairly be attributed in any way to the rheumatic poison, and more than half of these are very doubtful.

Third, among my patients only 19% gave a history of previous attacks of articular rheumatism, and 18% a history of muscular pains that they ascribed to rheumatism.

Fourth, 8% of the cases of acute tonsillitis were attended by or immediately followed by articular rheumatism; the same number claimed to have had muscular rheumatism, while in 5% the rheumatic attack immediately preceded the angina.

Fifth, there is not, as yet, sufficient evidence to prove that the tonsil is the only or even the chief portal of entrance for the rheumatic poison. Considering, however, that, in all probability, acute articular rheumatism represents a mild type of septic hematogenic infection of the joints, there is no reason why the tonsil with its notorious facility for infection with pyogenic germs should not, possibly even frequently, assume the role of an infected wound leading to septic consequences of a systemic nature. These septic conditions vary in degree and location and rheumatism is perhaps one of the phenomena.

Sixth, the evidence does not yet justify the belief that inflammation of the tonsil may prevent (or take the place of) an attack of rheumatism.

Seventh, the statement that the acute beginning of muscular rheumatism is nearly always preceded by tonsillitis is not supported by

the histories of my cases, in only 2% of which did muscular rheumatism follow tonsillitis. However, in 6% muscular pains that were called rheumatism attended the tonsillitis, though they may have been due to the fever attending the inflammation of the tonsils.

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34 Washington Street.

Congenital Atresia Naris. Report of a Case. GEORGE COHN.

Monatschr. f. Ohrenh., Berlin, Dec. 1904.

The author reports a case of unilateral bony atresia of the left naris near the choana, in a boy 10 years old. From a critical review of the literature of the subject, he arrives at the following conclusions: Sex has no influence on the frequency of this deformity. Half of the cases are bilateral, but in the unilateral cases the right side is more frequently affected. Seventy-five per cent. of the cases are associated with high-arched palate. Interference with breathing and feeding may cause the death of the patient during infancy, but, if the patient survives, mouth breathing and anosmia are the main symptoms. Operative treatment gives good results, but if the atresia is unilateral the symptoms are so slight that operation is not always necessary.

YANKAUER.

THE MOUTH, NOSE AND THROAT IN THEIR RELATIONS TO THE STOMACH AND INTESTINE.*

BY OTTO J. STEIN, M. D., CHICAGO, ILL.

My remarks will be restricted to the clinical relationship of the upper air tract and the gastro-intestinal organs.

If you but recall that the greater number of affections of the mouth, nose and throat are either local manifestations of some more general disturbance, as, for instance;

Laryngeal tuberculosis in pulmonary tuberculosis;

Mucous patches in syphilis;

Perichondritis of the larynx in typhoid fever;

Coryza in measles;

Angina in scarlet fever;

Paralysis of vocal cords in tabes;

Pharyngitis sicca in diabetes mellitus,

or that the regional disturbance creates or favors the introduction of other conditions, as a

Foreign body resulting in pneumonia;

Rhinitis resulting in erysipelas;

Septal ridges resulting in asthma;

Adenoids resulting in epileptic equivalents;

Diseased tonsils resulting in rheumatism;

then it will be seen that only a few remain as distinctly local affections, and you are at the same time more fully prepared to accept the cause and effect theory of respiratory and gastro-intestinal disturbances. But to designate in every instance which is the cause and which the effect is not possible. In many cases, a critical clinical observation shows the sequence of conditions. The same kind of mucous membrane and its continuity favor this. That both regions are the common highway for the introduction of chemical, thermal, microbic and parasitic irritation is another etiological factor. The intimacy of nerve and blood supply is also to be considered.

The association of the mouth, nose and throat affections with stomach and intestinal diseases has long been recognized, but owing to the division of the domain of medicine into its numerous

* A Paper Contributed to a Symposium on Gastro-intestinal Diseases, and read before the Chicago Medical Society, April 3, 1907.

special departments, there occurs not infrequently a neglect amounting at times to an absolute disregard for the other departments of medicine, so that too often we are looking with myopic eyes at a field whose confines are restricted by the anatomical boundaries of our chosen specialty, ignoring and forgetting that neighboring or remoter territories may influence or be influenced by our own.

As laryngologists, we are constantly called upon to determine the location of the cause of some symptoms like chronic cough; painful spot in the throat; hoarseness; dyspnea; dysphagia; nasopharyngorrhea; hyperesthesia; paresthesia; or a paralysis, and not infrequently our examination reveals a disturbance of the alimentary tract as the exciting or predisposing cause. The writer has observed cases of urticaria, herpes and angio-neurotic edema of the throat; acute laryngitis and chronic epiglottitis and laryngitis; acute pharyngitis and chronic naso-pharyngitis that have resulted from a disturbance of the digestive tract. Edema of the larynx in catarrhal inflammation of the bowels and also in cirrhosis of the liver has been reported by Schrötter, Schmidt, and Löri.

Take, for instance, the common canker of the mouth. Here we have the simplest and most frequent association of a disturbance of the digestive tract with the mouth. The same may be said of the coated tongue, stomatitis and the like. Although all of these conditions are commonly due either to changes in the salivary secretion, bad teeth, or a debilitated condition, in many the association with a disordered digestion is too patent to be ignored.

The acute pharyngitis so often observed at the commencement of typhoid fever, or the herpetic eruption of the pharynx, followed at times by deep and destructive ulcers, and the acute laryngitis followed in some instances by ulceration, perichondritis and paralysis, although not essentially the cause or effect of any bowel lesion that is present, but the association of the two conditions as manifestations of the same disease, become of common interest and importance to both the laryngologist and internist. An epistaxis occurring on successive days in a healthy adult, excepting for slight fever, or an attack of acute pharyngitis, are oftentimes the signal of an impending attack of typhoid.

The vomiting that may accompany chronic gastritis causes a passive hyperemia of the mucous membrane of the throat, and so does the regurgitation of dyspepsia. A faulty diet with its attending digestive disturbance may induce a lithemic condition that will often call forth most annoying and persisting nose and throat symptoms,

and if the digestive disorder is recognized as the promoting factor and corrected, the distressing rhinitis and pharyngitis are immediately relieved. Beverly Robinson has been frequently quoted as saying that the butyric acid and other products of gastric fermentation and putrefaction aggravate catarrhal states of the upper air tract.

In atony of the stomach and bowel, we have a condition favoring the absorption of toxic material, which becomes the irritating agent in the production of catarrhal changes of the mucous membrane. Nervous dyspepsia at times reflects itself onto the upper respiratory tract in the form of a hyperesthesia, paresthesia or paralysis. An overloaded stomach may give rise to spastic laryngeal symptoms, probably reflexly through the vagus. Spasmodic croup in children is frequently relieved by an emetic. Worms in children producing irritation of the intestines provoke or at least aggravate catarrhal manifestations of the nose and throat.

Chronic constipation may cause a hyperemia that ultimately results in thickening of the mucous membrane of the pharynx and larynx. Some of the large varices seen at the root of the tongue are produced by the same condition. There is a variety of constipation, many times present in anemia, wherein the collection of "clinkers" of fecal material constitutes the characteristic features. In these cases it is not uncommon to find nasal or laryngeal symptoms which are relieved whenever the inspissated masses are removed.

I have found that the presence of indican in the urine in excess has furnished me invaluable information as to the cause of many otherwise intractable cases of catarrhal conditions. Hence it is my practice in such cases to ascertain the functioning condition of these organs, and if they cannot easily be corrected by simple but judicious measures, they are placed in the hands of the internist who can correct them, and it is astonishing with what salutary results.

I wish to direct particular attention to two diseases of the digestive tract whose influence is felt in the upper air tract. The first in an atonic state of the stomach and bowels. The weakness of the expulsive forces that constitutes such atonic condition causes a dilated stomach and bowel, which results in the accumulation of food and gases, and the gradual increasing size of the organs causes pressure upon the blood vessels and nerves and displacement of neighboring organs, so that a true splanchnoptosis may result. It is in this class of cases that a chronic naso-pharyngitis is often-times found that will defeat every effort at treatment unless the

cause be recognized, and the patient referred to one conversant and skilled in the correction of such disorders.

The second condition that I desire particularly to draw your attention to is that of malignancy of the esophagus. In its early stage symptoms referable to the throat are at times complained of. The symptoms are either pain on swallowing or paresthetic sensations that are referred only to the fauces or pharynx. Personally, I have been led to a correct diagnosis of cancer of the esophagus by just these symptoms in several cases. The lack of this knowledge was the cause of my not recognizing the first case. In three cases there was no obstruction to the passage of food or drink. The pain is referred to the tonsils and root of the tongue, while the pain in malignancy or tuberculosis of the larynx is, as a rule, referred to the ears. I consider this symptom of such great value that in anyone complaining of painful or paresthetic sensations in the tonsillar region or at the root of the tongue, and in whom no positive local condition can be determined, or that is not purely hysterical, as strongly presumptive of beginning malignancy of the esophagus.

Thus far my argument has been directed to a presentation of some gastro-intestinal causations of upper respiratory affections. That reciprocal causative factors reside in the latter region is just as true.

In individuals affected with the raspberry-like enlargements of the posterior end of the lower turbinals, in the edematous swellings of the posterior nares, and in the disease known as Thornwald's disease, there is commonly a superabundance, of thick, viscid secretion which, owing either to a repugnance on the part of the patient to hawk out, or an impossibility to do so, is swallowed, ultimately inducing such gastric symptoms as nausea, vomiting, gastralgia, and flatulency, which results in loss of appetite, irregular eating, and a perverted diet, so that these patients soon assume the additional burden of some true pathological disturbance of the gastro-intestinal tract.

In the presence of a chronic purulent disease of the nasal accessory sinuses, particularly the sphenoid and posterior ethmoidal cells, there is added to the abundant acrid secretions of the simple catarrhal affections the element of infection. In chronic empyema of the sphenoid sinus, with or without an associated nasopharyngeal atrophy, the purulent secretion can be seen trickling down the side of the pharynx from above, and passing into the esophagus.

The influence that nasal obstruction has upon the blood in lessening the number of red blood corpuscles and lowering the percentage of hemoglobin and the return to a normal condition after correction of the nasal difficulty, has been demonstrated by D. Braden Kyle, Schadle, and others. To my mind, the importance of this in the production of nutritive changes in the body is great, and may explain the origin of some of the digestive disturbances. If nasal obstruction reduces the red blood corpuscles and the hemoglobin, then there follows a lessening of blood oxygenation and a retention of carbonic acid gas, and as a consequence tissue metamorphosis is retarded, and as the excitability of the nervous and muscular tissues of the body depends upon a continuous and generous supply of oxygen, interference with the same induces among other conditions impairment of the assimilative processes.

I wish but to direct your attention to the physiological relationship of the sense of smell to stimulate appetite and digestion. When the sense of smell has been abolished by hyperthrophic changes or destroyed as in some other cases, like atrophy, the sense of taste is perverted, and as a consequence the craving for food or its enjoyment is lacking, and a state of malnutrition can easily follow which is usually attended by a variety of symptoms referable to the gastro-intestinal tract.

Friedrich refers to the frequent association of dyspepsia with atrophic rhinitis and pharyngitis due, he avers, to swallowing of the fetid secretions.

The diseased faucial tonsil has come into considerable prominence of late as the cause of a host of body ills. But it can scarcely be disputed that a tonsil whose large crypts are filled with quantities of foul-smelling and multi-bacteria-laden secretion is not favorably located for the squeezing action of the muscles of the throat, which carries the contents of the crypt into the pharynx, where it mixes with the food, and thus contributes to the production of fermentive changes in the stomach or aggravates a pre-existing condition therein by providing the infecting material. Several observers (Turck and Stucky) have investigated the bacterial relationship of these two regions in affections occurring concomitantly, and their findings indicate a cause and effect.

Many of these diseased tonsils require the most scrutinizing examination to disclose the existence of any trouble. The gland may be small and present no signs of redness or cryptic involvement, until it is rolled out from behind the anterior faucial pillar, and its

numerous crypts are explored with a fine probe. This is particularly true as to the supratonsillar space, and especially so when the plica triangularis is over-prominent and hypertrophied. Large cavities or dilated crypts filled with pus emptying into the throat through an apparently normal-looking crypt opening have come under my observation, the abundant purulent secretions having been swallowed and having set up profound digestive disturbances as well as septic symptoms. Several workers have directed attention to the association of suppurative disease of the tonsil with attacks of appendicitis, suggesting something more than a coincidence of affections.

Mycosis leptothricia is especially noted by some observers (Richardson and Ingals) as being associated with gastro-intestinal disturbances.

Another variety of the mycosis, in which its parasite, *sarcina ventriculi*, has been actually found present in the stomach (Good-sire, 1842) associated with the condition in the oral cavity and pharynx, is the mycosis *sarcinica*.

In a third variety of mycosis known as actinomycosis, Abbe reports a case located in the esophagus secondary to its appearance in the mouth.

In a fourth variety—mycosis *mucorina*—Sendziak reports Paltauf, of Vienna, as having observed a case with enteritis and peritonitis. The patient died after fourteen days and the phlegmon showed the parasite, *mucor corymbifer*.

In mycosis *soorina*, known also as thrush, we have a variety of mycosis common in the mouths of infants, and not infrequently it is associated with digestive disturbances.

The implication of the esophagus in any of the mycoses, according to Sendziak, is, as a rule, one of continuity of tissue from the mouth. Nevertheless, primary cases have been reported in the esophagus (Mackenzie) and the stomach (Zalesky).

In pulmonary tuberculosis the question of reinfection from the swallowing of the sputa is reasonably established.

Affections of the teeth and gums occupy a conspicuous position in the causative relationship with gastro-intestinal disturbances, but the subject is entirely outside my province to discuss.

CONSIDERATIONS RELATIVE TO NASAL OBSTRUCTION.*

BY A. E. PRINCE, M. D., SPRINGFIELD, ILL.

My purpose in choosing such a broad title as "Considerations Relative to Nasal Obstructions" is to put together some thoughts which have a general bearing on the whole subject, without attempting to exhaust any particular phase. The abstract of my paper is embodied in the following questions, an endeavor to answer which will be made in as brief a manner as consistent.

First: What is the cause of the prejudice regarding tonsil operations, and what is the remedy?

Second: Why do some operators frequently have failures in adenoid operations?

Third: Why do many operators use the cautery and snare in treating inferior turbinal enlargement?

Fourth: Why does any one attempt an operation for nasal polypus in the middle meatus without removing the middle turbinates?

Fifth: Why does any one ignore the relation of the accessory sinuses in the consideration of nasal obstruction?

Sixth: Why does any one attempt the handling of a malignant growth unless he is inclined, in emergency, to open and curette or cauterize with the thermal cautery, the remotest corner of any one of the accessory sinuses?

I am convinced that the prejudice against tonsillectomy which prevails is due to the slipshod methods which have prevailed in the past. It has seemed such an easy matter to slip a tonsillotome over an enlarged tonsil which is not submerged, and is free from palatal adhesions, that many of the doctors of the land have indulged in this unscientific method, and in most of the cases left behind a considerable portion of the tonsil.

When one thinks that the reason these organs are hypertrophied is because of the fight which is being waged on the part of nature, on the one hand, in her effort to destroy the invading microbes, and the microbes, on the other (being tubercular in 10 per cent of the cases), in their effort to involve the system, the futility of cutting in two the barrier wall becomes at once apparent. Further, the operator who is responsible for the prejudice, has been in the habit

* Read before the Eleventh Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology, St. Clair, Mich., August 30, 31 and September 1, 1906.

of ignoring adenoids, hypertrophied turbinates and deflected septums. He has promised good breathing, and the result has been weighed in the balance by the public, and found wanting. Ten good operations will not balance one failure, and as long as physicians perform incomplete operations, prejudice resulting from failure will continue to exist.

To facilitate the removal of the tonsil, it is essential, in the difficult cases, to separate the pillars which may be adherent to the tonsils. The patient is placed on a chair or table, preferably a Yale chair, which can be so tilted as to incline the body head downward sufficiently to let the blood flow out when the face is turned to the side. The chair is raised *ad maximum* and the operator sits on a low stool so that his head is as low as that of the patient. An original O'Dwyer gag is preferred, since its curve permits it to be inserted on the right side of the mouth, permitting the largest space for the introduction of the left fore finger into the naso-pharynx. A good operation for nasal obstruction means a comprehensive



Fig. 1. Author's Tonsil Scissors.

grasp of the situation, and the removal of all the causes of obstruction, whether it be the tonsils, adenoids, turbinal enlargement or septum deflections. In the practice of the author all these operations excepting those for deflections are done at one time, and to accomplish this, much depends on position, instruments, anaesthetic, etc., which will be briefly considered.

A combination scissors and separator is here offered, which has been found efficient in the author's hands. After grasping the tonsil with an efficient forceps, it is first inserted under the anterior pillar, and the blades separated. Next, the palato-tonsillar membrane is divided, and the incision is carried down behind the tonsil, separating the posterior pillar. The tonsil may then be dissected out down to the fauces with such scissors as may meet with favor at the hands of the individual operator.

The adenoid operation is next undertaken.

Many operations for the removal of adenoids have failed because they are done with a large curette—and without digital co-operation.

This is illustrated by cases in which a nodule of adenoid is found anterior to the vomer.

The operator who attempts the operation with a Gottstein's curette or adenotome, will fail to reach such portions. A case comes to mind in which a child had two operations, both under an anaesthetic, without result. Upon digital examination, a remnant was found on each side anterior to the posterior line of the vomer, which could only be reached with a narrow curette or a forceps.

As a matter of fact, the curette has been almost discarded in favor of a type of forceps which is here exhibited.

Another reason why adenoid operations are often unsuccessful is the timidity which prevails regarding the use of a general anaesthetic.

An operation which is done without an anaesthetic is often unworthy of the name. If the result were open to inspection after a Gottstein's curette had been thrust into the pharyngeal vault of a frightened child, the surgeon would consider himself disgraced.



Fig. 2. Adenoid Forceps.

In these operations we must attain 100 per cent of success. The man who exonerates himself by claiming that he told the truth nine times out of ten is to be compared with the doctor who congratulates himself for having had 90 per cent of success in adenoid operations. The 5 or 10 per cent of the partial failures may seem very small, but the physician owes it to every individual child that is brought to him suffering from oxygen starvation, to provide capacity for complete aeration. This can only be accomplished by the use of general anaesthesia, especially in children. Here a word is *apropos* regarding the use of an anaesthetic. It matters little whether it be chloroform or ether or ethyl bromide. The main point is that the operator must overcome timidity, for no operation requires more profound anaesthesia than those on the throat and nose. Timidity can only be overcome by the establishment of confidence in some quick, simple, always-at-hand method of resuscitation of suspended animation. The method recommended is the direct inspiration. This is accomplished by extending the head, press-

ing on the stomach with the left hand, closing the nose with the right, placing the operator's mouth over that of the patient and blowing the latter's lungs full of freshly inspired air. Repeat this every three seconds. The ashen or livid lips will assume a normal color, and may be maintained so indefinitely. Commence this whenever respiration lags, and you will soon gain the confidence in the method which is essential to success.

Regarding the use of the cautery, chemical or galvanic, in the treatment of turbinal obstruction, it is my belief that better results are obtained by the method of excision. An examination of the nose in a condition of intumescence will reveal the fact that there is an amount of mucous surface in excess of that required to cover the inferior turbinate bone. At the posterior end this is distended by the accumulation of blood until quite a balloon is formed, which



Illustrating the method of crowding the hypertrophied posterior portion of the mucous membrane of the inferior turbinal between the branches of the forceps.

After grasping, rotate forceps to the right for the right side. The left forefinger is inserted, and not the right, as exhibited in the illustration, which was made necessary by the conditions of photography.

alternately expands and contracts. The principal symptom is the alternating obstruction of one side or the other. ..

The treatment of these cases by the cautery method destroys the epithelium, and leaves a membrane which adds little moisture to the air in passing. Submucous cauterizations do not give the lasting benefit derived from excision. The cauterization of the posterior end of the inferior turbinate has proved so unsatisfactory that the majority of operators resort to the snare.

The application of the snare requires the use of cocaine, which contracts the vessels, and defeats the very object one wishes to obtain. The shrinking of the erectile tissues prevents the application of the snare, and at best, but a small strip of mucous membrane is

removed, insufficient to effect a complete relief from the symptoms of obstruction.

This difficulty was experienced by the author about twenty years ago, at which time he designed a forceps for the removal of the hypertrophied redundant tissue along the lower edge and posterior end of the inferior turbinate. The forceps was given a concavity on the biting edge corresponding to the curved surface of the inferior turbinate. On the convex surface, it was left open so that it might grasp firmly the tissue and bite through the membrane. It was made very strong, so that if a portion of bone was found to reach quite near the floor of the inferior meatus, it would cut it away and establish a free meatus, it being the design to remove whatever fell into the grasp of the forceps. The instrument has not been very popular owing to insufficient knowledge regarding its manipulation, as well as to defects which have resulted in efforts to cheapen the construction. To be efficient, the hinge should have a strong reinforcement on both sides, or else the coaptation of the edges will be imperfect.

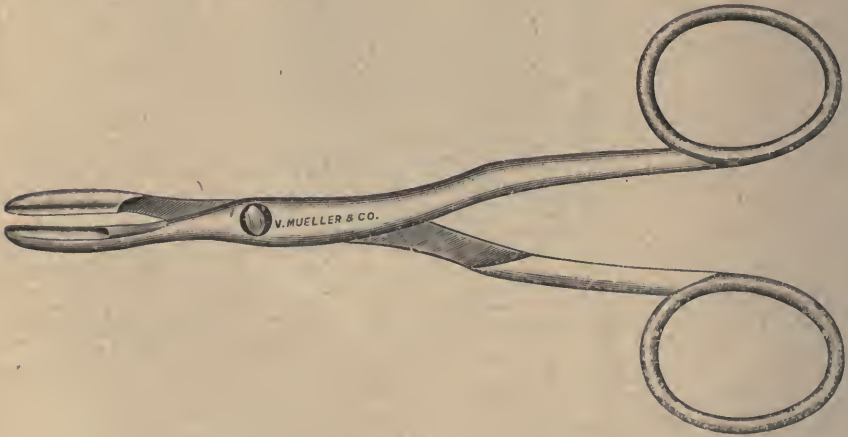
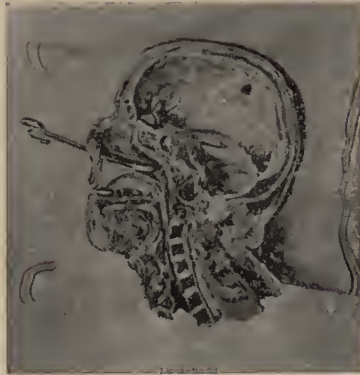


Fig. 3. Author's Middle Turbinal Forceps.

In view of the fact that it has been in daily use in the author's hands for this long period, with almost universal satisfaction, it may be permitted to repeat a word regarding its manipulation. To get the best results, the patient is under the influence of ethyl chloride or chloroform, to escape the contraction of the vessels which attends the use of cocaine. He is placed partly on the right side with body inclined head downward.

The instrument is inserted into the inferior meatus with the biting edge down. When the advancing end has reached the posterior extremity (see cut) of the inferior turbinate, it is turned so that the

concave surface is in contact with the free surface of the inferior turbinate. At this point, the blades are opened, and the rotation is continued, which brings the inferior blade under the lower edge, when it is closed, and secures the redundant soft tissue, and perhaps a narrow strip of bone along the free lower border. Before clos-



Illustrating the third position of the inferior and post-turbinal forceps, showing that it grasps nothing in a normal nose with mucous membrane contracted. If hypertrophied or relaxed, it will remove a strip the length of the lower margin of the inferior turbinal. This strip is removed by rotation of the forcep.

ing, the forefinger of the left hand inserted back of the palate, presses the soft post-turbinal tissue into the grasp of the forceps. In this manner a strip is secured, extending the entire length of the inferior turbinate, and representing the amount of tissue that

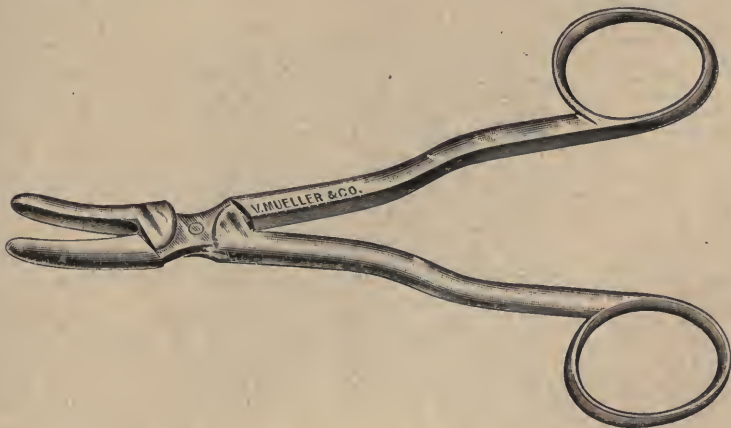


Fig. 4. Forceps for Bridges between Septum and Inferior Turbinal.

can be spared, and still leave enough to cover the remaining inferior turbinate bone. The handles are then taken in the hollow of the hand, and squeezed ad maximum. If the edges are sharp, they will

cut almost through the tissue. At this point do not pull, but continue the rotation and push the forceps into the pharynx until the strip is loosened.

There will be considerable hemorrhage, which usually ceases spontaneously. I avoid packing or inserting a plug or splint, although occasionally use a compressed sponge, and saturate it, when in position, with a drenalin solution. Some attention must be given to bridging. The use of a bulb ear syringe, and normal salt solution, three times a day by the patient, will usually complete the cure.

This operation has been done by the author more than one thousand times, and the minimum of trouble at the time or later has made this instrument and method regarded with great favor.

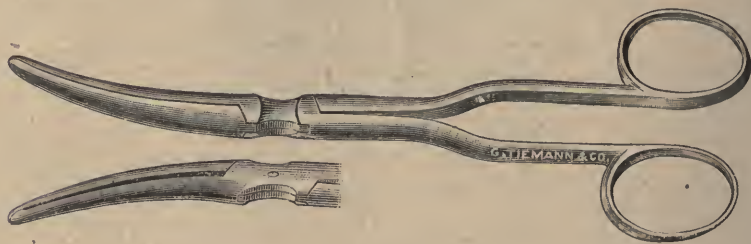
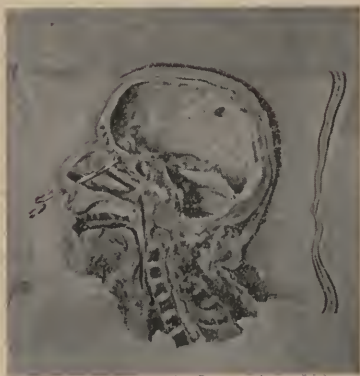


Fig. 5. Forceps for Post-Turbinal Hypertrophy.

POLYPUS IN THE MIDDLE MEATUS.

In answer to the question regarding the removal of polypi in the middle meatus, it should be acknowledged that in the past no operation in surgery has been less efficient. These polypi usually arise as



Illustrating the operation of the superior turbinal punch, for exposing the nasofrontal duct and permitting the removal of the ethmoidal cells, by the intra-nasal route.

a result of secretion from the frontal sinus or ethmoid cells or maxillary sinus. The secretion irritates the membrane, and causes it to proliferate. This further interferes with the escape of the secretion, and results in a development of polypi which usually originates at

a point which cannot be reached without the removal of the middle turbinal, and the exposure of the hiatus semilunaris.

It has been the authors' lot to work in this field before Luc and Grünwald produced their instruments, to facilitate work, and it may not be without profit to exhibit an instrument which has served many years in the removal of the middle turbinate, and at the same time all the polypi which infest the region, short of opening the sinuses.

This forceps is called "middle turbinal or bridge forceps." The use of this instrument entirely supplants the snare, and it is believed that it has sufficient merit to make it worth a trial.

A further thought regarding nasal obstruction is the turgescence due to diseases of the accessory sinuses, sight of which must not be lost. This may be illustrated by reference to a case of polypus. The growths prevailed on both sides, and were removed together with the middle turbinates, under a general anaesthetic. On the right side, the obstruction was entirely removed, but on the left, it was found that the patient could not breathe well. This was partly accounted for by the fact that the septum encroached on that side, but the main source of the obstruction was found to be due to the secretion from the frontal sinus, which kept the entire mucous membrane in swollen condition. Persistent pain was complained of over the left frontal region. It was decided to insert a gold drainage tube into the sinus, after the Ingals method, which was done. This rendered the discharge free, and under improved drainage, the quantity diminished, and the character improved. Free drainage or a radical operation is recommended as a remedy for the swelling, which may prevail in conjunction with the empyaemia of the accessory sinuses of the nose.

In closing, it seems desirable to say a word regarding the obstruction due to malignant growths. During the past year, three cases have presented, which have served to modify my opinion on this subject.

First, that of Mrs. S., age 30, a bleeder, suffering from complete obstruction due to a growth in the right side of the nose. Several attempts had been made to remove the growth, but nothing was accomplished on account of the alarming hemorrhage. The history led to the belief that it was a malignant growth, and the fact was explained to the husband. An operation was undertaken with faint hope. It was found to be a soft sarcomatous growth, filling the maxillary antrum, having completely obstructed the inferior and middle meatus. Owing to the profuse hemorrhage, the operation

was made as rapidly as possible, and the cavity packed. In a month the nose was filled with the same growth, and respiration, which, after the operation, was free, was entirely obstructed.

Believing that the X-ray would be useless in such a case, it was recommended purely to postpone the fatal sentence. To my surprise, in two months the patient developed a breathing space which increased from day to day, until the growth entirely disappeared, and today she is a well woman

Second: Mrs. H., wife of Dr. Hubbard, of Virginia, Ill., developed a growth on the left side, which proved to be a round-cell sarcoma, involving the vomer and palate bones.

Stimulated by the recovery of the former case, the use of the X-Ray was assiduously persisted in. Extensive necrosis continued, until the case was regarded as hopeless. At this stage, cleft existed in the palate; the entire septum was destroyed, and part of the externa of the nose. After returning home, the use of the X-Ray was continued by Dr. Carl Black, of Jacksonville. She greatly improved, but was not satisfied. About the time the necrosis was under control, she sought aid from Christian Science, and is now, I understand, entirely well.

Third: Mrs. N. presented an obstruction to breathing on both sides. Diagnosed by microscopic section as sarcoma.

The tumor involved the septum, which necrosed extensively. The growth was radically removed, and cauterized with galvano-cautery. X-Ray treatments were commenced, but did not at once control the progress of the necrosis. After six months of close observation, however, the case made a complete recovery.

In the past, I have relinquished these cases after a feeble fight against what seemed an unmerciful destiny, but since having my experience of success in the last three cases, I shall in the future put up a more vigorous fight with the most improved X-Ray coil.

On six occasions, I resorted to galvano-cautery, which, I am very sure, was essential. This makes it impossible to estimate the degree of importance to be attached to the X-Ray, but is my conviction that without these two remedies, the results would have been fatal.

If the sinus is involved, one should consider himself in the position of a drowning man, and fight the enemy with cautery and X-Ray after freely opening and curetting the sinus or sinuses which may be involved.

628 E. Capitol Avenue.

PERITONSILLAR ABSCESS.

BY CHARLES M. ROBERTSON, A.M., M.D., CHICAGO.

This disease is described by different authors as Peritonsillar plegmon, Phlegmonous tonsillitis, and Quinsy. It is seldom a disease of the tonsil itself, as it usually affects the tissues surrounding the gland. It is a result of an infection in the supra-tonsillar space from decomposition of material squeezed out of the crypts which empty their contents on the superior surface of the gland. It is accompanied by systemic disturbance and great pain. It may be coincident with infective fevers, especially scarlet and typhoid. It may assume different forms according to the location of the pus as determined by the anatomic relation of the parts. Thus we distinguish a proximal, ventral, dorsal, lateral, or a combination of any of these forms.

If, upon examination, we find a swelling which forces the tonsil distalward, we should be justified in thinking the pus was situated in tissues proximal to the tonsil, a proximal abscess. If the tonsil is pressed dorsalward, the pus will lie between the tonsil and the anterior pillar, a ventral abscess. If the tonsil is pushed ventralward, presenting well into the mouth, we find the pus dorsal to the gland, a dorsal abscess; while, if the tonsil occupies a position toward the medial line, we know the pus is lateral to the tonsil, a lateral abscess. It is possible to have a proximo-ventral, proximo-dorsal, proximo-lateral, ventro-lateral, dorso-lateral, ventro-distal, dorso-distal, or a latero-distal abscess.

In cases where pockets or sinuses exist around the tonsil we may have a lateral or distal abscess, which, by burrowing of the pus along the muscles of the neck and the cervical fascia, may produce a subglottic abscess. The author has observed such abscesses which ruptured into the trachea. Death has occurred in such cases from suffocation or from aspiration pneumonia.

Etiology. Suppurative inflammations such as we are considering may result from an infection of the tonsil which has occurred as the result of bacterial infection from the mouth or naso-pharynx. In most cases, however, the author believes peritonsillar abscess the result of an infection in or about the tonsil itself, caused from decomposition of caseous masses thrown off from the crypts of the

tonsil. There is often thickening of the pillars from recurrent tonsillitis, or the pillars become attached to the gland by inflammatory adhesions. This produces closure of the opening between the supra-tonsillar fossa and the pharynx. This condition of closure may also be caused by hypertrophy of the faucial tonsil. Destruction of the supra-tonsillar space by hypertrophy of the faucial tonsil will produce the same result by the openings of the supra-tonsillar crypts pressing against the junction of the pillars.

In all cases examined by the author of those who had experienced peritonsillar abscess, the presence of cheesy masses in the superior crypts of the tonsils (*THE INFECTING CRYPTS of the author*) could be demonstrated. In many cases it was difficult or impossible to gain an entrance into these crypts on account of *a*, the hypertrophy of the gland destroying the supra-tonsillar space; *b*, the adhesions of the pillars to the top of the tonsil; *c*, the presence of the plicatonsillar, which in many cases is persistent and covers the entire top of the gland.

I have seen many cases who had one, two or more attacks of Quinsy yearly, and in each instance crypts were found to contain greater or less quantity of this cheesy material. I have arrived at the conclusion that such abscesses are caused by infection from this extruded material in the crypt itself, or in the supra-tonsillar fossa, undergoing decomposition with pus formation. Even cases beginning as a follicular tonsillitis I believe are so caused, the follicular tonsillitis producing an inflammatory condition in the part which helps in the production of a favorable condition for the decomposition of these masses and the absorption of the poison thus produced. This is borne out by observation, as we see follicular tonsillitis cases pass the active inflammatory stage and then suddenly the abscess develops after the follicular disease has disappeared. If this space were cleaned out early, the abscess would not develop.

Pathology. The pathology resolves itself into an infection produced by the retained caseous material being decomposed, which produces an infection in the part, characterized by a true inflammatory process, with heat, redness, swelling and pain. There is an increase in the quantity of blood in the part, with extravasation of serum, then leucocytes and abscess formation. The lymphatics under the tongue and jaw and in the cervical chain take up the infection, becoming swollen and painful. The suppurative process is limited only by the amount of infection taken up by the lymphat-

ics and the character of the poison. A deep-seated infection must of necessity be more profound than a superficial one, because it is retained more closely and the consequent accumulation of pus is therefore greater. Much also depends on the character of the infecting material. We frequently find an lateral abscess much larger and therefore containing more pus than an ventral quinsy.

Symptoms. Preceding abscess, we usually have an acute inflammation of the tonsil in the form of follicular or lacunar tonsillitis. This condition lasts from a few hours to three or four days. The patient first complains of a dryness in his mouth and throat. There is a distinct rigor, followed by chills, aching pains in bones and muscles, particularly in the muscles of the back. They complain of headache, constipation, scanty urine, loss of appetite, with fever of high degree, often reaching 104-106° F. The tongue is covered by yellowish gray or brown material. The pain is severe and worse upon attempting to swallow, when it radiates into the ear and over the side of the neck. Inability to open the jaws is a marked symptom of this disease.

As the disease progresses, the tissues become very red, swollen and edematous, especially the palatal arches and uvula. The epiglottis and rim of the larynx may be affected, and in such cases there is great danger to breathing from this condition, as well as from the fact that the soft palate sometimes becomes so large and elongated that it may drop into the larynx, producing stenosis of the laryngeal aperture.

After the first few hours, the dryness gives place to an excessive flow of secretion, which adds to the discomfort of the patient. The breath becomes offensive, breathing more difficult, and swallowing more painful.

On account of the swollen tissue and inability to open the mouth, it is difficult to get a view of the parts. When possible to palpate the swelling, it has a hard, tense feel, which may exist even when abundant pus is present. The swelling of the tissues may extend into the walls of the post-nasal space and cause occlusion of the Eustachian tube orifice, producing acute otitis media. The swelling varies from the size of a hickory nut to that of a lemon. Pus may extend into the crypts of the tonsil, breaking down the gland which may form a part of the abscess cavity. The abscess usually ruptures or is evacuated in a few days, when the symptoms rapidly disappear.

Should there be tissue necrosis, we may have a destruction of or rupture into the Eustachian tube, causing a suppuration of the middle ear, or, by contraction of tissues after rupture of the abscess, leave a constricted Eustachian tube. The walls of the larger vessels may be weakened by extension of tissue necrosis extending backward and outward, and aneurism of the internal or external carotid produced. One case of aneurism of the internal carotid came under the observation of the author from this cause. In this case the physician examining the swollen mass, which was supposed to be a recurrent quinsy, was shocked, after he had introduced a tongue depressor to examine the swelling, to see the patient gag and the blood gush out of the mouth till death came in a few seconds. Thrombosis of the internal jugular has been reported as a sequel of this form of quinsy. If none of these complications occur, the tonsil is left inflamed and the pillars adherent and thickened.

The cause is not removed unless the tonsil becomes a cicatricial mass as a result of the abscess formation, or is enucleated, which, of course, precludes the possibility of recurrence of the disease.

Diagnosis. The diagnosis is not difficult when based upon the clinical findings. It might be confused with syphilitic gumma or malignant tumors, but the symptoms will easily differentiate between these diseases. If in doubt, we can easily make the diagnosis clear by the use of the knife or exploring needle. We should note the previous occurrence of the disease, the pain in the muscles of the back and limbs, pain and difficulty of swallowing, inability to open jaws, high temperature, involvement of lymphatics and swelling, and duration of the disease. When pus is present, fluctuation can be determined, care being taken to tell that it is pus and not an aneurism. One would hate to plunge a knife into an aneurism and see his patient die before he could do anything to prevent it.

Treatment. Should we see the case early enough, the cleansing of the supra-tonsillar fossa would avoid the attack. After the disease is established, free catharsis, salicylates pushed for ten or twelve hours will do much to relieve the pain and reduce the temperature. Hot salt solution as a gargle continued for some length of time will do something to reduce the edema, as will a gargle of adrenalin. Cocain proves distressing to many and is of little value on account of its depressing action on the heart, even when used in weak solution. Draining the abscess by a liberal incision is of the utmost importance and should be done thoroughly. The

exact line of incision depends upon the form of abscess presenting. The abscess cavity should be broken down if divided and irrigated at the discretion of the surgeon.

After the attack has passed, the tonsils should be enucleated, which insures against the recurrence of the disease.

It is absolutely necessary to take *all* of the tonsil out, as ordinary operations of decapitation done by means of the tonsillotome will not suffice. After the tonsils are removed, a search should be made for the existence of pockets in the tissue of the soft palate between the pillars, and if such be discovered they should be destroyed by the removal of the medial wall or surface.

100 State St.

Intermittent Nasal Obstruction. L'ESTRANGE (Roma, Queensland.) *Austral. Med. Gaz.*, Oct. 20, 1906.

After pointing out the physiologic role of normal nasal breathing, the author dwells particularly on the fact that patients frequently complain of dry cough, irritation, and loss of voice, with a tendency to coryza, headaches, morning hebetude, tonsillitis of mild character and sometimes bronchial troubles, yet only careful examination will determine that there is mouth breathing at night only.

One or both turbinals may show a groove which corresponds to some projection from the septum, but more often one must depend for diagnosis on the morbid state of surrounding parts, combined with the patient's statements and admissions, i. e., the small adenoid spots on the posterior wall of the pharynx, the congestion of the laryngeal mucous membrane and of the vocal cords, etc. "If the patient be directed to fasten up his mouth and chin at night by means of a suitable apparatus, either an amelioration of the symptoms and conditions follows or he complains that he is unable to sleep."

To operate on a nose apparently normal requires a certain amount of assurance as to result. Nocturnal obstruction once recognized is easy to remove by the ordinary methods for rendering the nasal fossæ free of all mechanical prevention of normal breathing.

EATON.

TREATMENT OF ATROPHIC RHINITIS WITH STRONG SOLUTIONS OF NITRATE OF SILVER WITH MASSAGE.*

BY GEORGE F. KEIPER, A. M., M. D. LAFAYETTE, INDIANA.

That the proper treatment of atrophic rhinitis is one of the great problems yet unsolved by the rhinologist goes without question. In fact, Dr. George L. Richards, in a paper before the Section of Laryngology and Otology of the American Medical Association, last summer, at Boston, characterizes "Atrophic Rhinitis a Reproach to Rhinology." Further, the multiplicity of remedies proposed and after a trial discarded, is evidence also for the statement. We seem to be far from a proper solution of the therapeutics demanded.

In this brief paper, I bring you my experience after fourteen years of practice.

At the outset we must recognize, if possible, the cause of atrophic rhinitis, and ask ourselves, What is atrophic rhinitis?

In this discussion, we will purposely omit such causes as syphilis and confine ourselves to its local treatment, recognizing in all cases where needed the value of internal medication to meet general conditions involved. Moreover, we will not use the word "cure" unless qualified by the word "symptomatic"; that is, it may be impossible to restore the nostrils of the sufferer to their former normal condition and function. We will be content to rid the patient of the dreadful fetor and crusts. If we can cause reproduction of bone and mucous membrane, we will count both as so much more gained than we had hoped. It is easy to tear down, but it is quite a different problem to build up structures in the human body.

Its etiology may give us some clue to its treatment:

Three bacterial formations have been found in these cases, namely, the Pneumococcus, Cocco-bacillus foetidus of Pertz, and the Bacillus mucosus of Abel. These bacteria are resistant to ordinary antiseptics in such strength as we are accustomed to use them.

In the August number for 1899 of the Annals of Otology, Rhinology and Laryngology is an article which covers thirty pages by Professor V. Cozzolino, of Naples, who discourses extensively and learnedly therein upon "The Bacteriology and Histology of Ozena." He concludes thus:

"My conclusion is that the bacillus mucosus is the etiologic factor in the production of two of the most disagreeable *symptoms* of

* Read before the Southern Section of the American Laryngological, Rhinological and Otological Society, Louisville, Ky., February 25, 1907.

ozena, viz.: fetidity and crusts; but it is by no means to be classed as the specific etiologic agent of ozena, as I maintained in the discussion of the bacteriologic etiology of ozena at the International Congress of Otology in Basle in 1884. The etiology of the bone atrophy, and, in consequence, of the mucosa, also, can be found in the nutritive alteration of the tissues of the turbinate bodies or of one turbinate body. This change begins in the bone and is often associated with a congenital, general, systemic disorder. I wish to emphasize the fact that the ozenous patient is born *ozenous*; that is to say, the child, which afterwards suffers with the full manifestations of the ozenous affection, comes into the world with a special predisposition for these nutritive changes, which determine as erosion of the bone and its ultimate destruction and atrophy of the mucosa of the turbinate bodies."

We have, then, two etiologic factors: (1) the bacterial, and (2) the hereditary predisposition.

First, let us examine the work of Cozzolino from the bacterial side. In all forty-two cases which he examined for bacteria he found the bacillus mucosus. However, in his experiments relative to germicides preventing its growth, the strongest solution of nitrate of silver used was 2%, and with no results. In fact, with the long list of antiseptics used, only four proved efficient, viz.: trichloroacetic acid, 100%; trichloride of iodine and corrosive sublimate in from $\frac{1}{2}$ to 1% solutions, and creosote, 4%. He seems to think that a solution of nitrate of silver stronger than 2% is not tolerated by the nasal mucous membrane. As oculists, we know that in gonorrheal conjunctivitis of the adult, or the ophthalmia of the newborn, we sometimes use as high as 4% solutions of nitrate of silver to the everted conjunctival surfaces of the eyelids, and with good results.

Attracted by the work of Abel in 1893 and the advice of Meyjes, as given in the second edition of McBride (1894), the writer began the use of very strong solutions of nitrate of silver to the nasal mucous membrane, beginning with a 12% solution and carrying the treatment up to a 30% solution. However, instead of simply applying it to the nasal mucous membrane, as Meyjes recommends, the writer proceeded to *rub it vigorously into the nasal mucous membrane as far as possible, at the same time exerting a tapping motion*. In other words, the general principles of massage are applied to a special field.

This brings us to the second point in etiology, the (2, Hereditary Predisposition. Whether it be true or not, one thing is certain,

the bone and overlying mucous membranes atrophy. The query is pertinent—can these structures be encouraged to grow? Massage has demonstrated its value in other organs of the body in producing growth, and why not in the nose. Hence, proceeding on this assumption, the writer has combined two treatments into one, namely, massaging nitrate of silver into the nasal mucosa. The organic silver salts have been tried and found wanting. In all cases a few applications suffice to cause the odor to disappear and the mucous membrane to take on a more healthy aspect, due, no doubt, in a great measure to the disappearance of the crusts and the stimulation which the silver solution, plus massage, produces. And often are we gratified to find the nose fill up with a regenerated turbinal and overlying mucosa.

The method of procedure is as follows: The nasal mucous membrane is thoroughly cleansed of all crusts and the best solution to use in the atomizer is the warm normal saline solution. It may be necessary to dislodge some by the cotton tipped applicator and some may need to be picked out with the ordinary ear forceps. Then a twenty-five per cent solution of cocaine is carefully applied to the mucous membrane with a cotton tipped application. This is done but once. After waiting awhile for anaesthesia a 1:1000 solution of adrenalin chloride is likewise applied if a tendency to bleeding exists. The adenalin is not absolutely necessary, as the nitrate of silver is hemostatic. The nose is then dried. The 12% solution of nitrate of silver is then applied on the cotton tipped applicator by rubbing and vibratory massage by hand. There is no particular advantage in the machine invented for that purpose. Nature has better equipped us. Then the nose is sprayed with the camphor menthol solution given below. The patient is given directions as to how to cleanse the nose with the warm normal saline solution, which is poured into the nose either by a tablespoonful or the little glass douche, or with the Dr. Vilbiss irrigator, introducing the little tube well into the nostrils. Every hour during the day time he or she sprays the nose with the following:

R	Mentholis	
	Camphorae aa,	gr. XXX
	Misce et adde.....	
	Olei Eucalypti	gtt. XXX
	Glymolis	℥IV

The patient returns to the office every other day until the fetor has disappeared and then twice a week, and as time progresses the solution is made stronger until a 30% solution is reached.

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ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding
that they are contributed exclusively to THE LARYNGOSCOPE.)

SURGERY OF THE LABYRINTH.*

BY JOHN D. RICHARDS, M. D., NEW YORK.

The following paper is based upon 11 cases of labyrinthine suppuration and necrosis.[†] Of these, four occurred in the course of acute or subacute mastoiditis; seven, in the chronic suppuration. In *four*, neither symptoms were present, nor was there anything in the previous histories suggesting inner ear involvement; the labyrinthine invasion was discovered at the time of the mastoid operation.

In *three*, no symptoms were present at the time of operation, though the previous history in each pointed to labyrinthine disturbance.

In *four*, decided symptoms were present at the time of operation.

In *three* of the eleven cases infective sinus thrombosis complicated the labyrinthine disease. In two of these the jugulars were thrombosed.

This relative frequency of sinus involvement is of surgical interest when we consider the vascular connection between the veins of the vestibule, the semicircular canals and the lateral sinus, and those of the cochlear and the inferior petrosal.

Three of the eleven cases died. The first death was from meningitis resulting from operative interference. The second death occurred in one of the sinus thrombosis cases and was due to meningitis resulting from operative interference. Though the sinus was occupied by an infected clot, the thrombosis was not an important factor in the patient's death, as the post-mortem re-

* Read before the Thirteenth Annual Meeting of the American Laryngological, Rhinological and Otological Society, New York City, May 30, 31, and June 1, 1907.

† The writer has since operated upon a twelfth case in which a cholesteatomatous mass invaded the internal ear through the oval window, forming a cast of a portion of the labyrinth.

vealed the pathway of infection to be from the labyrinth along the course of the auditory nerve. The third death occurred in one of the sinus thrombosis cases and was due solely to the infective thrombosis. In this instance the jugular was occluded by an infected purulent clot which extended below the clavicle into the deep thoracic portion of the vein, it being impossible to get below the cardiac limit of the clot. In this instance the labyrinth was in a perfectly healthy condition and had been so for a period of over ten days before the development of the sinus symptoms. The first two deaths resulted from improper technique and the specific errors—for the sake of emphasis—will be referred to in their respective places. I regard these deaths as sacrifices which could now be avoided.

The labyrinthine capsule showed the following lesions:

In five, the only visible lesion was a loss of the prominence of the horizontal semicircular canal.

In one, the oval window was the seat of fistula through which granulations protruded. The vestibule, the semicircular canals, and the lower half of the first cochlear whorl were involved.

In one the prominence of the horizontal canal had disappeared. The oval window was perforated and filled with granulations; a second perforation was present through the centre of the promontory through which polypoid granulations sprouted and pus oozed. The canal system was filled with granulations, the vestibule and cochlea with granulations and pus.

In three, the horizontal semicircular canal had disappeared and the oval window was the seat of fistula and filled with granulations. The canal system, the vestibule and the cochlea were involved in each.

In one, there was a perforation just above the horizontal semicircular canal in the region of the solid angle. The inner vestibular wall was also the seat of a fistula which communicated with a large epidural cerebellar abscess in the vicinity of the internal auditory meatus. The entire labyrinth was involved in the purulent process, which had also destroyed the greater part of the petrous pyramid, necessitating its removal.

Of the 11 cases, therefore, the horizontal semicircular canal, either alone or in combination with other lesions of the capsule, was involved in nine.

The oval window was perforated in five; the promontory, or first cochlear whorl, in one.

The labyrinthine capsule in the solid angle of the semicircular canals in one.

The inner vestibular wall was perforated once.

In all, there were seventeen perforations in the eleven cases,—sixteen through the outer labyrinthine wall, but one through the inner. This is of surgical importance, and one of two conclusions is evident—either in the great majority of cases the labyrinth is invaded by direct extension through the capsule from without, or else the outer wall of the labyrinthine capsule is exceedingly more vulnerable than the inner. Both are true.

The cases show conclusively that the fistulous openings in the external capsule do not always represent avenues of invasion from without inward, but avenues of escape through which pus is successfully discharged from the labyrinth into the middle ear.

In every instance in which the vestibule has been involved the canal system and the cochlea—either in whole or in part—have been involved also.

The first question which from a surgical standpoint we are called upon to decide—and it is one with which we are frequently confronted—is the following: If after the diagnosis of labyrinthine suppuration is made we operate and find in the outer capsule of the labyrinth no fistula, shall we explore it upon the symptoms, fork tests, etc?

To take a correct surgical attitude with reference to this important point, we will consider first, briefly, the diagnostic value of certain chief symptoms and tests; second, the dangers which attend the exploration of the labyrinth; and third, the dangers which attend the non-exploration of the labyrinth. I trust that a brief reference to the surgical value of the first will not be misinterpreted, in the present paper which is concerned chiefly with the treatment of labyrinthine suppuration.

1st. In the vertigo, vomiting, nystagmus and disturbances of equilibrium of labyrinthine origin, there is nothing characteristic.

2d. Even if we can exclude cerebral and cerebellar disease and can fix these symptoms definitely upon the labyrinth, they are not indicative of actual invasion of the labyrinth; they merely signify disturbance of labyrinthine function; but this occurs with comparative frequency from causes entirely extra-labyrinthine: from polypi, cholesteatoma, pus in the middle ear under pressure, etc.

3d. The mere fact that these symptoms are associated with a suppurative process is of little diagnostic value, as the extra-laby-

rinthine causes which produce these symptoms by transmitted pressure are, as a rule, associated with a suppurative process also.

4th. Cases occur, presenting all the above symptoms and in addition fork tests, which, according to orthodox interpretation, point to labyrinthine involvement which when operated upon show no evidence of labyrinthine involvement in the outer capsule, and which completely recover without having the labyrinth explored; these cases are not uncommon.

5th. In my own cases the forks have been of doubtful value in differentiating middle ear from labyrinthine lesions.

Briefly: seven of the eleven cases lateralized to the side of labyrinthine lesion. In six bone conduction was not shortened in duration. Of seven in which the greater part of the entire labyrinth was removed, four not only lateralized to the side of the labyrinthine lesion and bone conduction was not shortened in duration, but by air conduction forks were heard throughout a considerable range of the scale.

6th. In every case in which I have seen the labyrinth encroached upon by either operation or disease, the organ has been rendered valueless for practical purposes of hearing. I refer also to several cases of acute mastoiditis in which I have seen the horizontal semicircular canal injured by accident, and which cases I have had the opportunity to examine.

7th. To expose the interior of a normal labyrinth to an infected cavity is highly dangerous to life. What the mortality is under these conditions, I do not know, as I am unacquainted with the literature of this subject; but from my own experience, I realize that the opening of a diseased labyrinth is a serious thing, and I am confident that it is far more dangerous to open a normal labyrinth in the presence of an infected cavity than a diseased one; for in the latter the pathways along which infection may travel to the intracranial cavity and sinuses have had the opportunity to become sealed through inflammatory processes.

8th. If we do not explore the labyrinth under the conditions mentioned, we may overlook certain cases of labyrinthine suppuration—for my own cases show conclusively that the labyrinth is not always invaded directly from without by encroachment upon the capsule, but that it may be infected by septic particles being transmitted to its interior along the avenue of the vessels, the outer capsule showing no perforation whatever, i. e., by a process of local metastasis. The pathological process is analogous to that in which

infection of the sigmoid sinus occurs from the antrum along the avenue of the communicating vessels, the intervening mastoid structure showing no apparent involvement.

Should we overlook such a case, we court two dangers:

1. Intracranial infection taking place along the communicating avenues with the labyrinth.

2. That the inner wall of the labyrinth will perforate before its outer wall.

With reference to the first: of the eleven cases mentioned, three had infective sinus thrombosis. This relative frequency throws some suspicion upon the labyrinth as a causative factor, for this proportion of sinus infections is entirely too high for the ordinary run of suppurative cases either acute or chronic.

That the infected labyrinth was responsible for one of the infected sinuses is probable, inasmuch as the symptoms of sinus involvement appeared six weeks subsequent to the cessation of aural discharge. This is suggestive of the role played by the communicating avenues from the labyrinth as infection carriers to the intracranial cavity, and the danger of overlooking such a labyrinthine sup-puration.

The frequency with which the cerebellar fossa is found post mortem to be the site of greatest pathological activity in cases of purulent lepto-meningitis, originating from suppurative disease of the petrous pyramid is also suggestive of the important part played by the labyrinth as a distributing center of infection to the intracranial cavity.

With reference to the second—That the inner labyrinthine wall will perforate before the outer, is not borne out by clinical fact, nor, would we suppose it on anatomical grounds.

Of the seventeen perforations in the labyrinthine capsule in the eleven cases, sixteen were through the outer wall, but one through the inner wall. This ratio of sixteen to one is, of course, misleading, inasmuch as the majority of labyrinthine infections occur by direct extension through the capsule from without, under which circumstances the inner wall of the labyrinth is not subjected to a comparative test of vulnerability.

Considering, however, the doubtful value of symptoms as indicative of actual invasion of the labyrinth, the difficulty of eliminating cerebellar disease, the unreliability of tuning forks in differentiating in this class of cases middle ear from labyrinthine lesions, the practical certainty that we will destroy the organ for the purpose of

useful hearing, the actual danger to life should we commit the error of opening a normal labyrinth to an infected cavity, the certainty that the outer labyrinthine wall will in the great majority of cases perforate before the inner wall—the correct surgical attitude is, not to enter the labyrinth upon symptoms, etc., alone at the primary operation unless there is direct evidence that the labyrinth is involved. While I can imagine a combination of symptoms and circumstances which would cause me to open the labyrinth at the primary operation, even in the absence of recognizable labyrinthine invasion, I have as yet met no case which presented such features, and it is to be sincerely hoped that the labyrinth will not suffer the indignity of reckless exploration and that it will not be entered without a due consideration of the possible results to life.

What route shall we adopt?

The following facts have bearing upon the selection of the route by which we enter the labyrinth. From a surgical standpoint the cases may be divided into two classes.

Of the first class, the first five cases are illustrative, in which a loss of the horizontal semicircular canal represented the only lesion in the capsule. These cases represent caries of the labyrinthine capsule in which as the extension proceeds from without inward by a process of erosion, the limit to which the labyrinth is surgically involved is, as a rule, represented by the carious area. In such cases we merely remove the carious area and follow it to its limit, and the route which we select depends upon the site of the lesion, which, as a rule, is in the horizontal semicircular canal. The reasons for the frequency with which the horizontal canal are involved are evident.

1st. The external semicircular canal, unlike the posterior and superior canals which lie deeply embedded, juts out upon the floor of the aditus as a small ivory-like hump and is exposed to the supuration process.

2d. Its exposure occurs at the point of greatest constriction between the tympanic and antral cavities, and at a point of great pathological activity. The canal is not only subjected to the action of pus but to the deleterious combination of pus under pressure.

3d. The aditus is an unyielding bony ring in the circumference of which the external semicircular canal represents one of its weakest points and it succumbs accordingly.

4th. The vulnerable point in the external semicircular canal is not at the extreme apex of its arch—the point of greatest exposure

--but at a point several millimeters below the summit of its ivory-like cap. This is due to structural differences at the points mentioned and to the fact that the base of this ivory-like hump is encroached upon or surrounded by a mass of cancellated bone which is easily disintegrated and in these cases always diseased.

I have seen no instance in which the extreme apex of the arch has been eroded: in every instance in which the canal has been involved the entire cap has disappeared.

In chronic suppurative cases we frequently have the opportunity to observe the effect of this undermining process as it has attained to different degrees of encroachment upon the lumen of the canal.

We find that the prominence of the canal presents at its base a thin, sharp edge so undermined that it would appear that by placing the finger-nail beneath it we could separate it as a little thin shell.

The manner of invasion in these cases is evident—the labyrinth is opened by a process of gradual erosion from without.

Of the second class, the remaining six cases are illustrative. In these the labyrinth is involved in a true suppurative process, and its various compartments are filled with granulations or pus, or both. These cases are in every way more formidable, more destructive and widespread, and more highly infective than the first and require bolder intervention. The vestibule is the site of greatest pathological activity, and in every instance in which I have found the vestibule involved, the canal system and the cochlea, either in whole or in part, have been involved also. This suggests the oval window as the most common avenue of entrance in the second class of cases, and this is in accordance with the pathological findings in the capsule as shown in the previous cases. In the true suppurative cases the oval window was perforated in every instance with one exception. We may also have in an individual case the two pathological processes mentioned at work at the same time.

Inasmuch, therefore, as the exploration of the canal system, involving to greater or less extent its sacrifice, is necessary in this class of cases, the route which we adopt resolves itself into the selection of that which from a manipulative standpoint is the most convenient, which least endangers the important structures in surgical relation, and which allows us to fully expose the limits of the disease. The only route which fully meets these requirements is posterior to the facial nerve, and the point through which it is safest to enter the labyrinth for reasons to be mentioned later, is the solid angle of the semicircular canals.

We prefer to enter the vestibule posterior to the facial nerve instead of anterior to it, for the following reasons:

1st. When the vestibule is involved the semicircular canal system, in the great majority of cases, is involved also. This necessitates its exploration, which entails its sacrifice.

2nd. The sacrifice of the canal system, even though it is not extensively involved, creates only an ephemeral disturbance, and adds no danger to life, as the canal system is not in important communication with the intracranial cavity except by way of the vestibule.

3rd. We secure the maximum amount of working room, the advantage of which can be appreciated only when we have attempted the actual operation; and we are better enabled to work in the axis of the petrous pyramid, which is the direction of greatest safety.

4th. We get a field unsoiled by blood and gain a clear conception of the condition within the vestibule, of the ampullary areas of the canals, and of the inner vestibular wall.

5th. The route anterior to the facial nerve does not permit an exploration of the canal system which we know as a rule to be involved, nor of the ampullary areas, nor of the major part of the inner vestibular wall, but only of its lower anterior portion—consequently fistulae through the inner wall of the vestibule may be overlooked; I have had one such case in which had I adopted the anterior route, I would have committed this error and sacrificed the patient.

6th. It is based upon the erroneous idea that drainage is the chief desideratum and will suffice. Mere drainage in this class of cases will not suffice, for not only is the interior of the labyrinth involved, but its capsule is, as a rule, profoundly diseased and such portions of it must be removed. In addition the complicated system of channels represented by the labyrinth cannot be satisfactorily drained from any one point, as from an opening in the outer vestibular wall.

That drainage through a given point will not suffice is shown by the fact that in many of these cases the outer capsule contained multiple fistulae—yet with multiple fistulae present, drainage was not accomplished. The mere existence of multiple fistulae, properly interpreted, is a plea for more efficient drainage than can be accomplished by this means. The attempt to drain the labyrinth through an opening in the outer vestibular wall, while it may in certain instances succeed, is comparable to the attempt to relieve cases of suppurative mastoiditis by merely opening the antrum. We

should make the effort to place the present operative procedure upon a thoroughly scientific basis from the first.

7th. From a manipulative standpoint the anterior route is far more dangerous; it is the more cramped; the anterior canal wall interferes seriously with manipulation in the upper portion of the cavity; we are working in a blind pit and are forced to do considerable work from without inward, the direction of greatest danger; first, as the dome of the jugular bulb may rise high, undermining the outer vestibular wall; and second, as the inner wall of the vestibule bulges outward at this point, making the anterior portion of the vestibule comparatively narrow from within outward, an injury to the internal auditory meatus is a much more probable accident.

What are the steps of the technique?

As a description of the complete exenteration of the labyrinth will embrace the various steps, that alone will be mentioned.

1st. A Schwartze-Stacke operation, by which we secure the maximum amount of working room, and in which we exenterate the bony angle included between the groove of the sinus knee and the under surface of the middle fossa, which better enables us to work in the axis of the petrous pyramid. We lower the facial ridge to its absolute limit, remove the fringe of bone on the anterior aspect of the facial ridge back to the descending limb of the facial nerve, remove the outer wall of the hypotympanum, and lower the level of the canal floor, securing by these steps the maximum exposure of the outer wall of the vestibule, and the dome of the jugular bulb should it rise high.

As exploration of the cochlea may be necessary, it is important that we see the exact position of the carotid artery by the exposure of its canal. In consequence we shave down the convexity of the anterior wall of the auditory canal, remove the lip of bone overhanging the mouth of the tube and evulse the tensor tympani.

This exposes the tube to curettement by which we relieve the field of blood, and it gives the maximum width to the apex of the cavity. Should the consistency of the bone permit, the arches of the semicircular canals should be delineated. This enables us to work with accuracy. (Fig. II.) The cavity should be cleansed; the tube packed with adrenalin gauze; the field rendered bloodless; the instruments and hands resterilized.

We next remove the prominence of the horizontal semicircular canal; it is a treacherous structure. The cutting edge of the chisel is placed at a point below the summit, but well above the level of

the fallopian canal, for this prominence separates along definite planes of cleavage, and as the outer lip of this semicircular canal is intimate with the fallopian, a fissure in the former may extend out into the latter. Should the plane of cleavage be on a level with or below the fallopian canal, the facial nerve may either be exposed by having its roof removed, as shown in Fig. X, or else completely undermined (Fig. V), under which latter circumstances we may definitely expect paralysis for it will ensue. The stroke should be made in a direction corresponding to the plane of the canal. The remaining canals are next uncapped, and the condition of the interior is noted. It will be found that the interior of the external semicircular canal most frequently of all shows pathological change. In opening the superior canal a curved gouge should be used. It permits the stroke to be made in the direction of safety. The danger arises from the non-support of this canal by solid bony structure.

Owing to the contrast between the dark interior of the canals and the brilliantly illuminated white bone surrounding them, the labyrinthine fluid may appear dark and be mistaken for blood or granulations; we should not be deceived by this illusion.

We next enter the vestibule through the solid angle of the semicircular canals by creating at this point a conical pit with its apex directed inward and gradually lowered until it enters the vestibule. As it is necessary to remove the inner lip of the horizontal semicircular canal, during this step the chisel should be held perpendicular to the plane of cleavage, and under no circumstances should it impinge upon the outer lip, which is intimately associated with the fallopian canal, together with which it is left as a bridge carrying the nerve which spans the vestibule. (Fig. IV.)

The opening in the vestibule is now enlarged until a full exposure is obtained of this portion of the cavity. Its inner wall should be searched for fistulae. In enlarging this cavity no pressure should be made upon the bridge. For this reason a curette is a dangerous instrument. A small sharp gouge is safer.

Owing to widespread necrosis, it is necessary in some instances to sacrifice the bridge of bone carrying the facial nerve. To accomplish this without injury to the facial, we select a curette with its cutting edge turned backward, utilize the superior rim of the bone cavity as a fulcrum and shave off from above downward in a direction parallel to the course of the nerve, the roof of the fallopian canal, thus leaving the nerve exposed in its gutter of bone, from

which it may be separated and lifted without injury. (Fig. VI.) Any filaments given off from the nerve should be cut and not torn from this structure, as unnecessary traumatism is committed. We next remove such portions of the bridge as are necrotic, but no more, for the nerve here represents a curve, and should it lose the entire support of its bony gutter, it apparently elongates and consequently sags or kinks and becoming enmeshed in this vicious position by the granulations, has its functions interfered with later.

In this condition the nerve stretches as an exposed structure from its point of emergence low down on the facial ridge, across the cavity of the vestibule to its entry into the inner wall of the tympanus, corresponding to a point above and anterior to the original site of the oval window. (Fig. V.)

In knocking out the inner edge of the bony ridge, which corresponds to the upper inner wall of the tympanum, the stroke of the chisel should not be made from behind forward in a direction parallel to the course of the nerve, but from above downward, or, from before backward; i. e., in a direction perpendicular to the course of the nerve and to the fallopian canal.

The reason for this is that the bone at this point tends to separate when struck from behind forward, along a plane of cleavage which crosses the fallopian canal, causing its fracture; as the fallopian canal at this point represents the greater portion of an exposed cylinder (Fig. I), its fracture results in the facial nerve being encompassed by a little annulus or cylinder of bone, which may be slid up and down upon the nerve, just as a ring upon a finger. This complication is—so far as the integrity of the nerve is concerned—a formidable one, and it requires the greatest patience to remove the little annulus without causing injury to the facial. To accomplish it we steady the annulus with mouse-tooth thumb forceps and with a pair of ronguers—the jaws of which are accurately apposed—crush it in a direction parallel to the course of the nerve.

To avoid this complication, it is only necessary before attempting the removal of the upper portion of the bony ridge that the fallopian canal should have been thoroughly converted into a gutter, by shaving off its roof, as mentioned, and by making the stroke in the direction indicated. Should the accident now occur, the nerve can be easily freed from the little mass of bone by slipping it through the open side of the annulus, or cylinder.

Should we have to expose the nerve as mentioned and shown in Fig. V, no attempt should be made to retract it or draw it to

one side for the sake of gaining room for manipulation, as this is unnecessary; for the fallopian canal at the points at which the nerve emerges from and enters the bone is represented by sharp, serrated margins, against which if the nerve is drawn it may be lacerated at its fixed points. The sharp spicules should be removed so that the margin of the canal at these respective points is represented by an even rim.

The next step is to expose the antero-inferior cavity of the vestibule by removing the posterior aspect of the promontory and the outer vestibular wall. (Fig. VII.) We select a gouge, the width of which corresponds to the distance between the round and oval windows. The cutting edge straddles the little bridge of bone separating these two openings, and the stroke—which is slight, for the posterior aspect of the promontory is brittle and fractures easily—is directed from above, downward and forward in the direction of the first cochlear turn. We must at this step think of the possible position of the dome of the jugular bulb.

The greatest care should be taken that the cutting edge of the chisel does not cross the cavity of the vestibule and impinge upon its inner wall, for the inner wall at this point bulges outward and is separated from the internal auditory meatus by a brittle partition of bone not more than 1-32 of an inch in thickness. (Fig. XVI.) Should the inner wall be fractured, we lose cerebro-spinal fluid and aside from the inconvenience caused by this accident, the infected operative cavity is placed in direct communication with the intra-cranial cavity and the patient's life is jeopardized; meningitis will probably result.

As the cerebro-spinal fluid is under pressure and is of low specific gravity, gauze does not act as an efficient plug to the rent; sterile wax is preferable.

By enlarging this opening, we secure, with the previous steps, the full exposure of the vestibular cavity and the beginning of the first cochlear whorl. Should we now find that the disease has invaded the cochlea, and this is the rule in the second class of cases, we must continue the exploration of the cochlea until we have followed the diseased process to its legitimate end.

We next remove the roof of the first cochlear whorl from behind forward, exposing its interior to a point just short of the carotid eminence. (Fig. V.) The instrument of preference is a thin, sharp gouge with no shoulder, the width of which is slightly greater than that of the cochlear whorl. Four structures are to be

avoided; the dome of the jugular bulb below, the eminence of the carotid canal in front, the base of the modiolus and the internal auditory meatus internally. The danger to the first two is slight; to the second two it is imminent, and injury to these structures is to be avoided only with the exercise of care.

By confining the removal of the cochlear shell entirely to the roof of its first whorl and not allowing the gouge to impinge upon the inner wall of the cochlear turn these last dangers may be averted. From the carotid artery in front, the cavity of the first cochlear turn is separated by a hard cuff of bone which serves the purpose of an efficient bumper: though thin this partition is sufficient. (Fig. XII.)

If we now find that the limit of the disease has not been reached, we must explore the remaining cochlea. This constitutes by far the most difficult and dangerous step of the procedure; for the cochlea, which represents an extremely small cavity encased in a brittle shell of bone, is hemmed in on all sides by structures which we cannot afford to injure. In front is the carotid artery, below the dome of the jugular bulb, behind the internal auditory meatus, above and behind in immediate proximity to the second half of the first cochlear turn, the knee of the facial nerve. A circle a quarter of an inch in diameter could be so placed as to pass through the majority of these structures.

Were the above factors the only ones to be considered, it would be comparatively easy to select a point on the cochlear shell, which from dead house work we had found to be a safe one, and open its cavity. But the difficulty lies in the fact that within this shell of bone is contained a structure which from its position is exposed to injury, and which from a surgical standpoint is the most treacherous of the internal ear; I refer to the modiolus.

Before approaching the cochlea it will be well to consider certain anatomical features of the modiolus which are of surgical importance. The modiolus represents a small pyramid of bone seated upon the internal auditory meatus, decreasing in size from base to apex. Its apex is its weakest point, but the next weakest point is not immediately below its apex, but at the extreme base; for its base is ex-cavated as shown in Fig. XI (Politzer), by the internal auditory meatus, and the pyramid consequently rests upon a mere rim of thin, brittle bone. If the chisel is applied to the pyramid well above its base and a stroke made, the fracture does not take place at the point of applied violence but at its base; when this oc-

curs the pyramid fractures completely round the circumference of its base and separates as a single piece of bone. (Fig. XIV.) The internal auditory meatus is consequently opened throughout its entire circumference, and as the diameter of the base of the pyramid, or the rim of bone upon which it rests, is about 1-6 of an inch, the loss of cerebro-spinal fluid is rapid. The failure to appreciate the surgical importance of this anatomical feature of the modiolus resulted in the death of the first patient.

If we now examine the modiolus with a strong convex lens we see that the pyramid has an outer casing of brittle bone and a core which is porous, made so by canals running from base toward apex for the passage of various structures. These canals are not completely filled by the structures which they contain, and this permits the cerebrospinal fluid to penetrate out into the modiolus.

During the second operation in which the modiolus had been removed well down toward its base it was noticed that a seepage of cerebrospinal fluid took place through its stump; the intra-cranial cavity had been placed in gross communication with the infected cavity in an altogether unexpected way through the afore-mentioned channels, and the failure to appreciate the significance of this structural character of the modiolus resulted in the death of the second patient. In this case the infection could be traced along the cochlear branch of the auditory nerve. It now became important to determine how far down from the apex toward the base the pyramid could be removed without putting the intracranial and operative cavities in gross communication; for in dealing with the anterior half of the cochlear cavity it is absolutely necessary to get rid of a portion of the modiolus.

It can be shown upon increasing the tension of the intracranial fluid in a cadaver by injection, or in the living subject by pressure over the internal jugular vein, under which circumstances the cerebrospinal fluid will penetrate as far out as possible into the modiolus (i. e., grossly), that the pyramid may be removed from the apex toward its base, down to a point corresponding to the termination of the first cochlear whorl without causing the loss of cerebrospinal fluid; i. e., without placing the operative and intracranial cavities in gross communication. As will be shown later, this suffices for the complete exploration of the anterior half of cochlear cavity.

In approaching, therefore, the cochlea, we must remove its shell in such a way as not to injure the modiolus. We select a point in

the cochlear shell corresponding somewhat to the apex of the cochlear cavity, and with a thin sharp gouge shave it down until the dark interior of a cochlear whorl shows through the thin lamella of bone. The stroke should be made from above downward and forward in a direction corresponding to that of a cochlear whorl.

Not infrequently the shell of the cochlea is scalloped and the position of the cochlear turns roughly indicated. In this way a window is created in the cochlear shell (Fig. X), and we now enlarge this window, completely exposing the upper portion of the cavity. (Fig. IX.)

In enlarging this window the small gouge is the instrument of preference; an attempt to insinuate a very fine curette beneath the opening in the cochlear shell causes its back to impinge or press upon the modiolus, which sticks up as a little tent pole in the cavity, and this may result in the fracture of the pyramid at its base. The gouge merely removes the shell without endangering the pyramid.

To expose the second half of the first cochlear whorl it is necessary to remove the apex of the pyramid down to a point corresponding to the termination of the first cochlear whorl, as shown in Fig. XII. This done, we can look down over the stump of the pyramid, upon the roof of the second half of the first whorl, which is indicated by the probe in Fig. XII, and with a small gouge carefully break through its roof from above as shown in Fig. XIII, exposing in this way the entire interior of the cavity of the cochlea. In breaking through the roof over the last portion of the first whorl we are in direct relation to the facial nerve and the internal auditory meatus, both of which must be avoided.

The probe in Fig. XII is wound round the base of the modiolus merely for the sake of illustrating the relations of the roof of the second half of the first whorl. An attempt to withdraw it may cause the modiolus to fracture; such a step, of course, would not be taken during actual operation.

In one instance I have had to exenterate the major part of the petrous portion of the temporal bone and the following points have impressed me:

- 1st. That the petrous pyramid in this particular instance was pneumatic; we would expect to find such extensive involvement only in bones of pneumatic structure for reasons which are evident.

- 2d. Where removal of the petrous pyramid is necessary it should first be exenterated; later the shell removed; otherwise the dura of the posterior and middle fossae bulge into the wound, constrict

the operative field which is extremely deep, and close it to successful view. Retraction of these structures is then necessary, but the best retractor is the shell of the petrous pyramid, as it commits no trauma, occupies no space, and is accurately applied to the surfaces to be supported.

A second reason for first exenterating the petrous is that the dura enclosing the superior petrosal sinus is firmly attached to the upper margin of the posterior aspect of the pyramid and separates with reluctance from this uneven lip. In consequence the vessel may be torn; sharp hemorrhage follows which is difficult to control, as it is not easy to place a compression plug between the dura and the bone, as the two do not readily separate. If the accident is to occur, it is more convenient that it should occur toward the end of the procedures.

We should attempt to save the facial nerve by preserving a bridge of bone extending from the lower portion of the facial ridge to the internal auditory meatus; with patience this may be accomplished and, in the instance mentioned, was accomplished. Even though the nerve be sacrificed, we should still attempt to preserve the bridge, the purpose being to give the dura of the middle fossa a seat upon which it may rest that it does not sag deep into the wound and become sealed in this position to the granulation bed springing from the floor.

When the dura is not supported it sinks and shuts off the apex of the operative cavity, rendering this portion difficult to handle, and it further obstructs drainage. No amount of pressure by packing with gauze suffices to maintain it in a proper position, as the gauze soon becomes soaked and its supportive influence lost. Should, for any reason, reoperation be necessary—and we must remember that dyscrasias may underlie such extensive destruction, and portions of necrotic bone may remain which circumstances at the time of operation either cause to overlook or to abandon—the dura sealed in its vicious position constitutes an efficient barrier to further operative interference. For this reason the operation should be thorough and all dead bone in the deep, apical portion of the pyramid removed. When the bridge is sacrificed the nerve, which represents a curve, is exposed over a considerable portion of its length and it kinks and becomes enmeshed later in the granulation bed; this interferes with function.

It is dangerous to attempt to remove sclerotic portions of the pyramid with the rongeur. The force requisite for a bite of the

forceps is great, the bone suddenly gives and as the jaws of the rongeur spring together, sharp slivers of bone are thrown with violence against the tightly stretched dura of the cerebellum, which makes an excellent target to be perforated. I have seen the posterior fossa opened in this way.

It is highly important to be familiar not only with the surgical anatomy in the operative position, but to know the consistency of the bone; to know the result that will follow a stroke of the chisel when made in a definite direction; for the bone of the petrous pyramid is structurally treacherous, changing rapidly from pneumatic to absolutely sclerotic structure, which may crack when struck far beyond the point of applied violence and in a direction contrary to that expected. We can obtain a practical familiarity with this important part of the technique only by repeated work upon the cadaver, and an attempt at a description of this part of the technique is useless. Generally speaking, we should, when attempting to remove sclerotic portions of the labyrinth, make the stroke in the long axis of the cavity which the sclerotic bone covers. While this is not invariably true, it is as near as the facts can be reduced to rule.

In operations upon the labyrinth a point of interest is to be noted with reference to the carotid artery, when through erosion of the carotid canal the artery is exposed to view, there is, as a rule, no visible pulsation in the vessel; I have seen the artery exposed in eight cases (some in chronic suppuration), and in only one instance was pulsation to be detected. If pressure is made upon the vessel with an applicator wound with cotton and the lumen of the vessel momentarily constricted, slight pulsation may be elicited. It is a wise provision that the vessel does not forcibly pulsate at this point and impinge upon the sharp serrated margin of the eroded canal; the walls of the artery in the canal are thin owing to a lack of the necessity for their full development.

The carotid canal serves a two-fold purpose: First, As the exposed artery in the canal shows no visible pulsation, or but a faint pulsation, it is evident that the carotid canal acts as a bumper to the pulse wave, diminishing its impact and shielding the brain from excessive shock.

Second, As the canal is rigid and does not permit the artery to dilate except within narrow limits, it has the practical effect of constricting that portion of the artery within its grasp. The effect is the same as when with the fingers we constrict the lumen of a rubber tube through which water is being forced by a rubber bulb, i. e.,

there is a tendency under these condition for the intermittent or remittent current to approximate a continuous stream. The carotid canal, therefore, not only protects the brain from excess of pulse impact, but it is a mechanism by which the inflow of blood to the brain is somewhat regulated and made more even and continuous. It is analogous to the hydraulic arrangement of the jugular bulb and sigmoid sinus on the venous side of the circulation, whereby an even outflow of blood from the brain is guaranteed.

During and following operation upon the labyrinth certain phenomena occur which are of exceeding interest.

If during anaesthesia we produce intermittent pressure upon the capitulum of the stapes, we may in certain instances induce nystagmus, which—should it occur—would rather point to the fact that the labyrinth is functioning and not grossly involved in a destructive process. This experiment may prove of some value from a diagnostic standpoint in determining labyrinthine involvement, when the capsule shows no fistula.

If during operation we irritate with a probe the interior of the semicircular canals we may at time induce nystagmus. In the cases which I have seen the nystagmus has been bilateral and in the horizontal plane, regardless of which canal was irritated. The irritation of the inner vestibular wall gives a similar result.

The ampullary areas of the semicircular canals are more sensitive to irritation than their arches.

The upper posterior portion of the inner vestibular wall appears to be its most sensitive part.

A nystagmus which prior to operation is very marked may not disappear under ordinary surgical anaesthesia until the semicircular canals are removed and the vestibule opened, when it may entirely cease.

If the horizontal semicircular canal is by accident injured as during the acute mastoid operation, vertigo, vomiting, and nystagmus may appear and may be marked; again, these symptoms may be entirely wanting. As a rule, the disturbances which follow the injury are exceedingly slight and ephemeral, and consist of horizontal nystagmus—most marked when the eyes are directed to the opposite side, and slight vertigo with a tendency on the part of the patient to fall away from the labyrinthine lesion. Profound disturbance of hearing, as a rule, follows.

If the operation has encroached to any extent upon a functioning labyrinth, particularly in cases where both the canal sys-

tem and the vestibule are removed, disturbed equilibrium, nystagmus, and vomiting, which is accompanied by nausea, as a rule, follow. The vertigo is more pronounced when an attempt is made to assume the sitting posture, and closure of the eyes augments the disturbed equilibrium. The patient, as a rule, tends to fall to the side opposite the labyrinthine lesion.

At first the nystagmus may be of marked rotary character—the globes rotate beneath the closed lids, and nystagmus is independent of an attempt to fix the eyes upon an object. Nystagmus may be present in whatever direction the eyes assume. In a few days a marked decrease occurs, and as a rule, though not always, the greatest excursion of the globes is in the horizontal plane. At first the oscillatory movements may be fine; later they are coarse, sluggish and jerky. The apparent fineness or coarseness of the movement appears to be dependent upon the rapidity of oscillation. The nystagmus, as a rule, presents the following features:

1st. It is most marked when the patient looks to either the extreme right or left lateral position.

2d. When the eyes are directed to the upper vertical meridian, slight nystagmus may be observed, which, at first may appear vertical in direction, but upon careful inspection a slight rotary movement will be seen. This latter is possibly due to the action of the extrinsic muscle of the eye.

3d. When the eyes are directed to the lower vertical meridian, the nystagmus is slightest, and, as a rule, absent, even though present in other meridians.

4th. The nystagmus is most marked when the eyes are directed to the extreme lateral position of the normal side. Even after the nystagmus has totally disappeared in all other meridians, it may still be made manifest when the eyes are turned from the labyrinthine lesion. Occasionally the patient tends to fall to the side of the labyrinthine lesion and not to the opposite side. When this occurs, the nystagmus may be most marked when the eyes are directed to the extreme lateral position of the operated side, or equally as marked as when turned to the normal side. There appears to be some harmony, as to direction, in which disturbed equilibrium and nystagmus are most manifest.

The vertigo and vomiting which follow operation upon the labyrinth, cease, as a rule, in a few days, and disturbed equilibrium and nystagmus soon subside. The patient, however, when attempting to walk a straight line, may show for some weeks or months sub-

sequent to operation a tendency to deviate from the involved side; he may so tend to fall immediately after operation. In other cases all disturbances of equilibrium disappear in a few days. This tendency to fall or to deviate from the side of the labyrinthine lesion occurs in cases in which the horizontal canal alone is removed, in which the canal system and vestibule are both removed, or in which the entire labyrinth is removed. In some cases a slight nystagmus may be observed months after the operation; it may persist for years.

In some instances where the nystagmus is not of sufficient degree to be manifest when the eyes are directed to infinity, it may be made so by having the patient suddenly converge and accommodate, though this is not the rule.

The primary direction of the oscillatory movements is away from the labyrinthine lesion, i. e., if the left labyrinth is involved the direction of oscillation is from left to right, or vice versa, no matter in what direction the eyes are turned; I have seen no exception to this.

The nystagmus and vertigo as above described are in no sense characteristic of the labyrinth; I have seen the same phenomena occur in cerebellar abscess, the location of which was in immediate proximity to its central lobe.

Upon the removal of the semicircular canal system, the vestibule, and the lower half turn of the first cochlear whorl, I have seen nystagmus, vomiting, vertigo, disturbed equilibrium, and intense high-pitched hissing noise, which were distressing before operation, immediately cease.

As to why the destruction of the semicircular canal system and vestibule may in the one instance be productive of vertigo, vomiting, nystagmus and disturbed equilibrium, and in the other cause these same symptoms to quickly disappear, I do not know, but even where these symptoms follow operation upon the labyrinth and are marked, they, as a rule, so quickly subside that it is evident first, that the semicircular canal system is not an indispensable factor to the preservation of equilibrium; and second, that we can scarcely attach to it the importance of being the central organ of the statical sense, as its loss can be so quickly compensated for and in some instances seem to produce no disturbance whatever; it evidently is a part of more or less importance in the great circuit governing equilibrium, but it is by no means an indispensable part, nor is the entire labyrinth indispensable.

Following the removal of the major portion of the labyrinth, conjugate deviation of the eyes may occur, the direction assumed being

upward and outward toward the operated side, as if the eyes were attempting to see the labyrinthine lesion. It should be mentioned, however, that in the two cases in which the phenomenon was observed, cerebro-spinal fluid was lost in both. This suggests that the conjugate deviation may have arisen from other causes than the destruction of the labyrinth. The conjugate deviation was noticed immediately upon the patient's emergence from anaesthesia.

Following the removal of the deep portion of the petrous pyramid, we may notice upon the patient's emergence from anaesthesia that both pupils are dilated ad maximum. This dilation probably results from disturbance of the sympathetic, at the deep, apical portion of the pyramid.

The pupils, though dilated ad maximum, may react to both accommodation and to light. The dilatation gradually disappears after several weeks.

Following the exenteration of the petrous portion of the temporal bone, probing or pressure in the immediate vicinity of the stump of the auditory nerve may produce vertigo, nystagmus, and the subjective phenomenon of intense noise, which noise is referred to in the involved ear. The trunk of the auditory nerve is capable of interpreting mechanical stimuli, as sound, and from the case which I had the opportunity to observe, I am inclined to believe that the trunk of the auditory nerve is also sensitive to waves of sound.

Following the exenteration of the labyrinth, the patient may be exceedingly sensitive to noise and to loud musical sounds. The sense of harmony may be lost and after several months regained. The patient, if subjected shortly after operation to loud musical sounds, as the playing of the piano, may become intensely dizzy, the vertigo attaining to such a degree that it necessitates his sitting that he does not fall.

It would appear that we receive through the auditory apparatus certain physical impressions which, when transmitted to higher centers, act as supporting influences to the preservation of station; that these, when not balanced by similar impressions acting upon the other ear cause, so to speak, an auditory imbalance; that the disturbance is due to the lateralization chiefly to one side of those impressions, which give rise to the subjective phenomenon of sound is questionable, inasmuch as the patient who was totally deaf before operation experienced then no such disturbance under similar conditions.

The phenomenon is suggestive of the great variety of factors which may act through the medium of the auditory apparatus and

quickly disintegrate and completely disappear. The nerve should contribute to the preservation of that condition which we speak of as the state of equilibrium—it gives us an insight into the intricacy of the function of the auditory apparatus.

Following the removal of the entire labyrinth, tinnitus may still persist in the involved ear; its character, however, may completely change, and in all the cases the tendency has been—even where the tinnitus before operation was intense and of high pitch—for it to assume a low, buzzing, inoffensive character after operation. Later the tinnitus may entirely cease.

When the facial nerve is exposed throughout its entire circumference, we may with confidence look for paralysis upon the patient's emergence from anaesthesia. The paralysis deepens and in forty-eight hours becomes complete. It persists from four to five months, even though no injury is done the nerve other than its exposure to the wound and its fluids, and though the reactions of degeneration may appear, the face under massage, and with time, regains its nearly normal expression; I have seen, however, no case in which the function has been so completely restored that the variation in the two sides could not be detected upon the act of smiling. When the nerve is exposed in the manner mentioned, it is difficult at the time of operation to make it respond to ordinary mechanical stimulation, and moderate heat does not affect it.

The facial nerve is structurally very delicate. I have seen a nerve after several days' exposure to an infected cavity which had been irrigated but twice with a 1-10,000 solution of bichlorid of mercury, be protected by sterile vaseline and subjected to no pressure by the packing and the dressing should be changed sufficiently often to keep the cavity clear of pus.

Subsequent to operation, meningitis may occur. It manifests itself in from forty-eight to seventy-two hours. It is characterized by the usual features, with the exception that the sensorium is remarkably clear till near the end; the termination is rapid. Though the postmortem may show a diffuse leptomeningitis, the cerebellar fossa is the site of greatest pathological activity. The route of invasion may be apparent, and in one of my own cases was along the course of the auditory nerve.

When the internal auditory meatus is opened, the rapidity of escape of cerebro-spinal fluid suggests the proximity to the canal of large quantities of cerebro-spinal fluid, as if the cerebellar fossa contained or was in direct communication with a relatively great

amount. In the period of approximately a minute, the cavity represented by the Staeke-Schwartz excavation may fill as many as three times.

Following the too rapid drainage of the cerebrospinal fluid from the cerebellar fossa the following symptoms may appear: a small, rapid, irregular pulse; embarrassed respiration, which may assume a Cheyne-Stokes character; an anxious, concerned expression, with cold extremities and pinched, livid features; marked restlessness.

These symptoms may be of such alarming character that death seems imminent, but with a lessening of the escape of cerebro-spinal fluid the whole picture may in the course of a few hours so completely change that the patient appears quite normal. These symptoms are undoubtedly due to a too rapid drainage of the water-bed of the brain, whereby the important nerve centres at the base, having lost their elastic support, sink and are brought into undue contact with the floor of the skull.

The quick disappearance of these symptoms upon the cessation of the escape of cerebro-spinal fluid forbids any other than a mechanical interpretation.

Following operations upon the labyrinth, large quantities of sugar and acetone may appear in the urine, and the clinical picture of diabetes may rapidly develop. These phenomena suggest that operation upon the labyrinth may be productive of a profound systemic shock which does not manifest itself in the usual disturbances of temperature and pulse. The causative relation, however, between shock and diabetes is highly suggestive of the major character of the labyrinthine operation.

In three cases where the major portion of the entire labyrinth was removed, including the semicircular canal system, there appeared to be after a lapse of over two years in the first, one year in the second, and nine months in the third, no sign whatever of muscular atrophy of either side of the body.

Where the destructive process in the labyrinth has existed for a long time and the irritative stage is passed, the organ, so to speak, is functionally silenced and shows no sign of life; its exenteration is followed by no disturbance whatever of equilibrium; no vomiting, vertigo, or nystagmus occur, as the compensating factors, whatever these may be, have made good the deficiency.

That the disturbance of equilibrium, nystagmus, etc., which follow the removal of portions of the labyrinth are due, to some extent, to the loss of these parts is highly probable, inasmuch as these symp-

toms continue, even though the interior of the labyrinth is thoroughly cocainized. That these symptoms, however, are not altogether due to the loss of these parts is evident, inasmuch as under anaesthesia, mechanical irritation of the interior of the vestibule may produce nystagmus, as may also pressure upon the ampullary areas of the semicircular canals. Pressure upon the stapes may give a similar result. Further, if we irritate with a probe certain portions of the labyrinth subsequent to operation, we may in some instances cause the patient to fall, by producing an intense vertigo. Nystagmus may also be induced or augmented by pressure over certain areas. It is highly probable, therefore, that the disturbances of equilibrium which follow the removal of portions of the labyrinth are due not only to the loss of the parts destroyed but also to peripheral irritation, to which the interior of the labyrinth is subjected. It is only upon this double basis that we can explain certain phenomena in connection with these cases.

For instance, in Case X of the writer's series, disturbed equilibrium, vertigo, vomiting and nystagmus which were intense and distressing before the operation, immediately ceased upon the removal of the semicircular canal system, the vestibule and the lower half of the first cochlear whorl. If, therefore, these disturbances are due to the non-activity of the canal system, and not to irritation, why should the patient when in possession of these parts have exhibited intense disturbances of equilibrium, and after their removal, which insured their non-activity, have shown no disturbances of equilibrium whatever?

Following operation upon the labyrinth, the pulse may be both irregular and rapid and this disturbance may be independent of the loss of cerebrospinal or labyrinthine fluid; the condition soon rights itself.

From the following facts certain conclusions may be drawn, which are of some practical interest in that they show the difficulties attending labyrinthine localization. If we remove the arch of the horizontal semicircular canal, there may follow, vertigo, vomiting, nystagmus and disturbed hearing.

The removal of the entire canal system and the vestibule may be followed by the same phenomena.

The accidental removal of the stapes may produce vertigo, vomiting, nystagmus, disturbed equilibrium and disturbed hearing. The destruction of portions of the vestibule and cochlea without destruction of the canal system produces the same phenomena. It is now

evident that if we deny to these various phenomena, representing several different functions disturbed, the entire labyrinth as the anatomical seat of each (for these phenomena follow no matter what portion of the labyrinth is destroyed) we are led to the following conclusions, which seem to be supported by clinical evidence:

1st. That if the integrity of the labyrinth is encroached upon at any point, the function of hearing, as well as the non-acoustic functions, is seriously interfered with.

(If the encroachment has been gradual and there is no apparent disturbance of equilibrium, etc., it is due to compensation.)

2d. That the disturbances which follow the destruction of a given portion of the labyrinth are not necessarily to be attributed to the loss of the parts destroyed.

3d. That the destruction of the labyrinth at a given point affects the function of distant parts as well. If, for instance, we destroy the entire labyrinth with the exception of the cochlea, or, if we merely remove the arch of the horizontal semicircular canal, we are at a loss to know whether to attribute many of the disturbances which follow to the loss of the parts destroyed or to the irritation of the parts remaining.

It therefore follows that an attempt at labyrinthine localization based upon symptoms will always be subject to the grossest error, and that the attempt to determine the functions of the various departments of the labyrinth by the experimental destruction of these will be subject to the same error.

The difficulty of experimentally determining with accuracy the functions of the various parts of the labyrinth with a view to labyrinthine localization, and this is here alluded to merely on account of its surgical interest, is due in large measure to the anatomical arrangement of the labyrinth, the essential feature of which is, that it is suspended in a fluid medium which is *continuous*. A disturbance of the medium at any point is transmitted throughout the entire apparatus and results in the disturbance of distant parts.

While this particular anatomical arrangement complicates the study of the physiology of the labyrinth, it is an essential attribute of an organ which embraces several distinct and separate functions, which are correlated to the extent that each is influenced through the same common medium and to some extent by the same primary cause—waves of sound.

The labyrinth is an example which illustrates the conservation of energy in the evolution of an organ in that the anatomical bases of its

several functions, which in reality represent different organs, should have been so grouped together and suspended in a common medium as to make common use of that medium. This arrangement is evidence of the influence which waves of sound exert upon the non-acoustic as well as upon the acoustic labyrinth and a practical example of this is illustrated by the case previously mentioned where the patient when subjected to loud musical sounds, after the extirpation of the entire labyrinth, was made so dizzy as to necessitate his sitting, his equilibrium having been profoundly disturbed.

While it is the purpose of the present paper to treat of only those conditions which have a surgical bearing, there are many facts in connection with the cases which are of interest in that they are in contradiction to certain theories which have gained a more or less widespread acceptance.

44 N. 49th St.

A Case of Nasal Hydrorrhoea Cured by Electrolysis. DR. VALENTIN. *Le Nord med.*, Jan. 15, 1906, No. 271.

Valentin reports a case of nasal hydrorrhoea in a patient at the menopause. Spraying with cocaine and stovine was without effect as well as constitutional methods such as strychnine and atropine. The application of electrolysis, however, was followed by a complete cure.

SCHEPPEGRELL.

Massage of the Stapes. TREITEL. *Arch. f. Ohrenh.*, Leipzig. Oct., 1904.

In two cases, massage of the stapes with the Lucae's pressure probe resulted in remarkable improvement of the hearing, lasting several years.

YANKAUER.



FIG. 1.

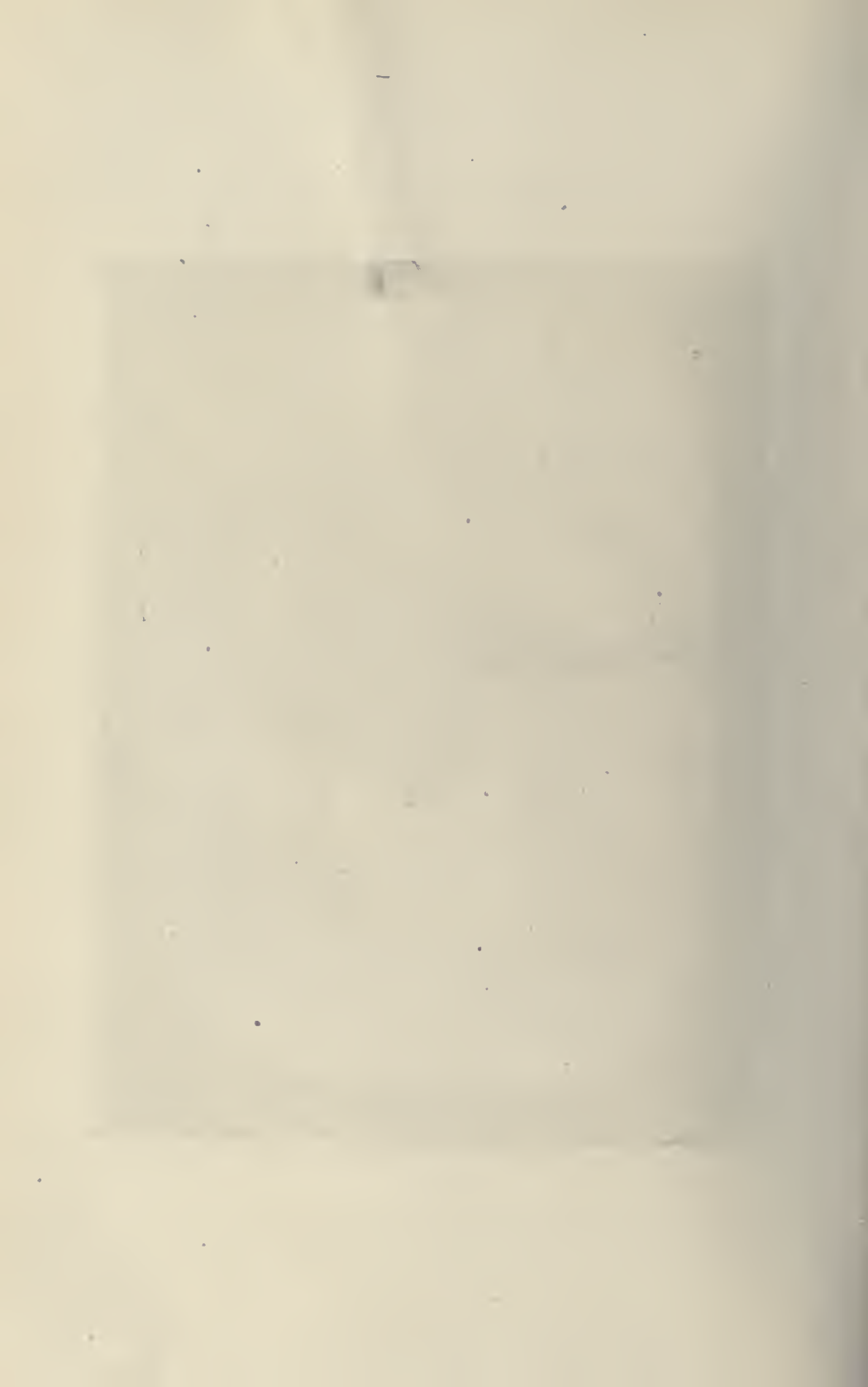












FIG. IV





FIG. V





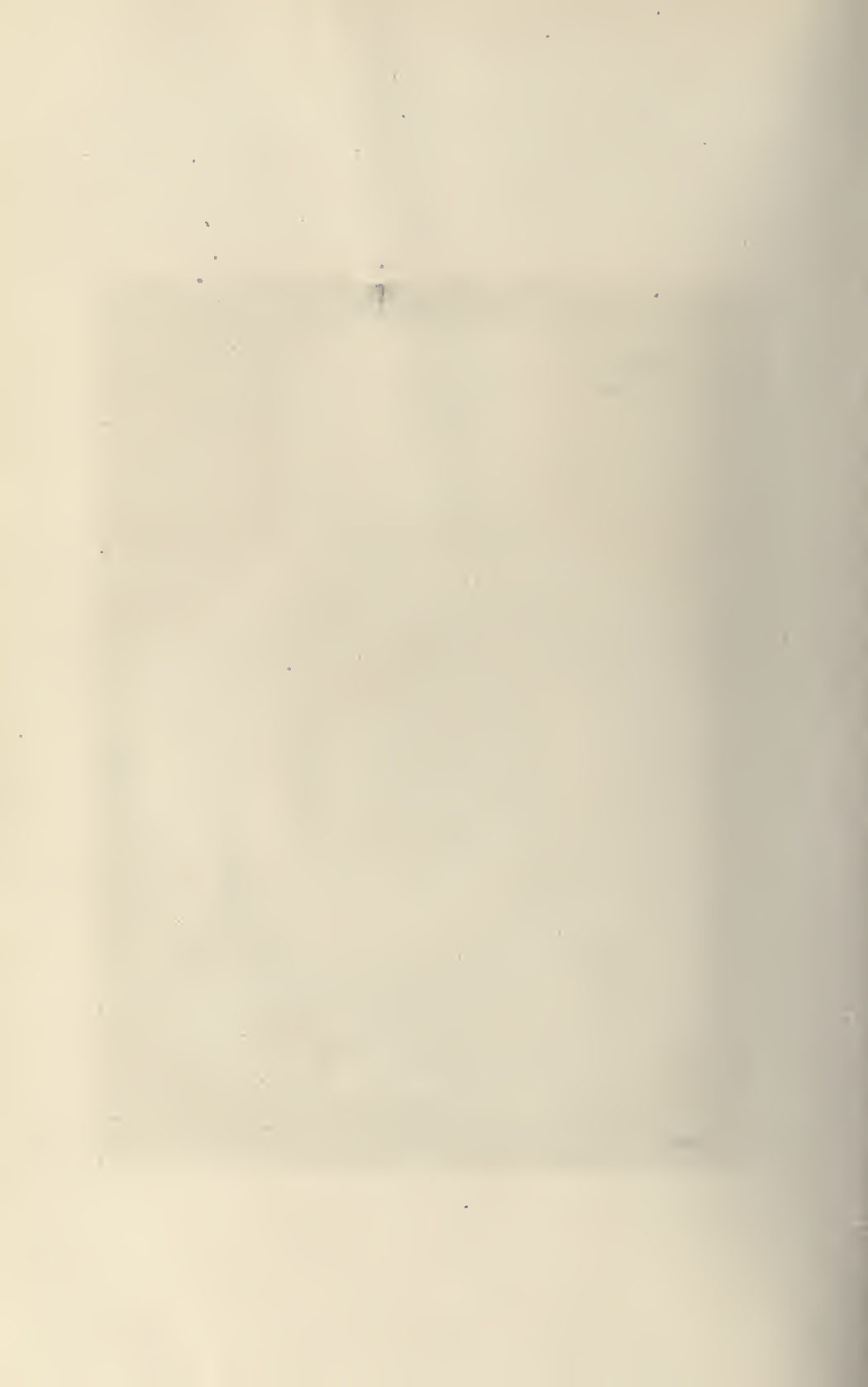








FIG. VIII









FIG. XII



FIG. XIII



FIG. XIV





A PLASTIC OPERATION FOR THE CLOSURE OF SEPTAL PERFORATIONS.

BY BURTON HASELTINE, M.D., CHICAGO.

Perforation of the nasal septum is a condition the importance of which is variously estimated. In the past it has been considered by most rhinologists as negligible and even in some instances as a desirable condition. There are text-books still in use which advise the making of perforations in some forms of nasal stenosis.

This wilful substitution of two deformities for one could probably find no advocates today, but current writers seem to agree that in correcting septal deformities by any method a certain percentage of subsequent perforations is to be expected. Cases are even exhibited as successful in which such accidents have occurred. This is a mistaken attitude destined soon to become as archaic as the plan of deliberate puncture. A post-operative perforation marks the surgical tyro and is no more excusable than any other evidence of bungling.

If discredit to the surgeon were the only unpleasant result of this condition it would be of little consequence; but such is not the case. In almost every instance, chronic ulceration takes place along the margins of the opening with crusting, bleeding and foul odor, requiring constant attention from the patient and subjecting him to great annoyance. As the erosion progresses the opening increases in size and in time comes to resemble that due primarily to ulcerative processes.

It is a question whether non-luetic disease of the septum can go to the extent of changing the external conformation of the nose; but it is my belief that in neglected cases this can occur. Certainly such deformities do exist where no luetic signs can be discovered, and the theory that spontaneous perforation necessarily means syphilis is no longer tenable.

Without attempting to magnify the seriousness of a small defect, it must be conceded that septal perforations are undesirable and if a suitable method for their permanent closure can be devised it will deserve a place among recognized surgical procedures. Heretofore this seems to have been universally regarded as impossible, but recent improvements in intra-nasal surgery have suggested to several men its feasibility. Goldstein of St. Louis was probably the first

publicly to suggest a plan. At the June, 1906, meeting of the American Laryngological, Rhinological and Otological Society, at Chicago (Middle Section), he described his clever device for covering the denuded edges of perforations and made a preliminary report of some experiments looking toward their closure. Yankauer of New York in the Laryngoscope for February, 1907, describes his ingenious method of sewing the mucosa and mentions two septal perforations successfully closed. This, I believe, is thus far the only published report of a case. Andrews of Chicago, in a personal interview recently, told me of having closed a small opening by a mucous flap and no doubt others are experimenting along this line.

All attempts heretofore reported have been by the making of a single mucous flap. This plan is necessarily limited to the closure of small perforations and even in these offers no great certainty of success. As the method which I have devised is radically different from those tried by others I will report my experience in some detail.

Up to the present time I have made six operations for the closure of septal perforations. One was a total failure, one a partial success and four were entirely successful. My first attempt was in the autumn of 1905 and was a failure. The patient had a narrow opening about ten millimeters long near the nasal floor, evidently due to the saw cut of an operation by the Gleason method. I resected the deformed cartilage and closed the opening by a flap from above brought downward and stitched along its inferior border. This was not a difficult procedure, as the opening was so placed as to be readily accessible and there was plenty of tissue to cover it. This flap was attached only at its posterior end, but with excellent approximation supported above by cartilage and with no tension, I expected a good result. I was, therefore, disappointed in a few days to find the flap sloughing and all the membrane edges curling away. The final result was an opening larger than before.

A result so different from those achieved by similar operations elsewhere led me to look for the peculiar conditions that produced it and these I found without much difficulty. First, I considered the blood supply and saw at once that I had violated the first rule of plastic surgery. The chief arterial supply of the anterior septum is the septal branch of the superior coronary and from this my flap was wholly separated. Its second supply is the superior palatine through the foramen of Stenson and this, too, was cut off. Its third and only remaining supply is from the nasopalatine branch of the

internal maxillary, running forward and downward near the upper margin of the vomer, and for this I had shown little regard.

I next studied the histology of reparative processes and learned that the septal flap is almost wholly devoid of the necessary connective tissue element. This explains why unsupported mucous membranes, however carefully approximated, will utterly refuse to unite. It also explains the inability of the septum to fill the smallest perforation by a granulating process. A small hole at the close of an operation means a larger one later, which is only increased by any effort at "stimulation."

I recognized, too, that septal cartilage is worse than useless in any effort at repair. A non-vascular tissue nourished by its coverings, it dies when exposed and instead of a support becomes a burden. Lastly, septal flaps are delicate, holding stitches poorly, and are incapable of bearing more than the slightest tension. The mere drawing of sutures through the membranes will often lacerate them seriously.

An operation to have any wide application must overcome all these difficulties. The following, therefore, are imperative requirements:

- I. To conserve the bloody supply.
- II. To provide a double flap for the aperture with an intact membrane under every seam.
- III. To leave no denuded cartilage. Denuded areas must be of bone or vascular tissue.
- IV. To require few stitches which must be easily inserted and produce no tension.

The operation to be described seems to meet all these requirements and has given me complete success in four cases. In one other it was almost equally successful, but a tiny opening at the upper apex resulted from too early removal of support.

The first successful operation was made in July, 1906, and shows a perfect result after fifteen months. It was a perforation very similar to the one above described, due to a sawing operation made by myself three years before. The second was made in October, 1906, and was equally successful. This was a post-operative aperture six millimeters in diameter.

Encouraged by these results, in December, 1906, I operated for the closure of an idiopathic perforation which was large enough to admit the end of my index finger as far as the first joint. There was a suspicion of syphilis in this patient, but no clear history could be obtained. Iodides were given three weeks before the operation

and for several months afterward, or as long as the patient could be kept under observation. When last seen the septum was in perfect condition with no ulceration or odor.

In my last case, the operation was subjected to the severest test and the result seems to positively establish its value. The patient, a man of forty-two, had a perforation which included almost the entire cartilaginous septum. Its posterior and inferior margins were bony and only narrow strips remained of the anterior and superior



cartilage borders. The opening was irregularly oval with a long diameter of one and one-half centimeters. A hard rubber tube, one centimeter in diameter, was passed through and did not fill it. A photograph showing such a tube in this position is reproduced herewith. No definite etiology could be determined in this case, but a luetic origin was suspected and the patient was so treated both before and after operation.

The patient was referred to me by Dr. Carlton A. Harkness of Chicago, at whose request I undertook the manifestly difficult task of restoring this septum. This was done on August 26th before several visiting rhinologists, to whom I am indebted for helpful suggestions and for the patience shown in witnessing a most prolonged and tedious operation. It was found to be impossible to use even the ordinary sutures in this case, as number three braided silk would cut through in forming a knot. A single suture was left at the highest point on one side and elsewhere the flaps were simply

smoothed out with the spatula and held in place with delicate lint pads. Moderate pressure was made from either side with Bernays sponges. This was lessened daily until the fourth day, when both sides were uncovered and examined. There was absolute closure at every point with no sign of retraction or of slough. The denuded areas were covering rapidly, the one in front having almost disappeared. The septum was supported by dressings in one side changed daily for three weeks, after which it received no attention except cleansing. The result is an imperforate septum quite normal in appearance.



Fig. A. General schema of the operation. b b, The incision anterior to the perforation. c c, The freshened edges of the perforation. e e, Posterior incision upon the opposite side of the septum. The sutures are shown in position.

TECHNIQUE OF THE OPERATION.

(1) The edges of the opening are carefully pared and V-shaped sections are removed above and below to allow approximation of the vertical margins without wrinkling. This is done with scalpel or with the Ballenger single-tine swivel knife.

(2) A vertical incision is made in the *septum mobile* and a flap is lifted backward to, and entirely around the perforation. This incision is placed far forward to make the widest possible flap anterior to the opening. It should extend upward to the nasal roof and downward into the floor, and it is well to include in the flap some of the underlying cellular tissue. The elevation should be car-

ried along the nasal floor to a point as far backward as the posterior border of the aperture.

(3) The muco-perichondrium of the opposite side is elevated entirely around the perforation and the bone or cartilage of its immediate border is removed. The swivel knife, bone forceps and chisel may all be useful here. The muco-periosteum of the distal side back of the opening is now elevated as for an extensive bony resection. This elevation must extend to the roof and into the nasal floor.

(4) A vertical curved incision with its concavity forward is made through the distal membrane far enough behind the aperture



Fig. B. a, The denuded cartilage after the anterior flap is sutured to the mucous membrane of the posterior margin of the perforation. f f, The suture.

to produce a flap wider than its antero-posterior diameter. This flap must be loosened until it can be drawn forward and sutured to the anterior margin on the same side, or better still, overlapped without sutures.

(5) The proximal flap is slid backward to meet the posterior margin if possible, but not far enough to uncover the juncture of the opposite membranes. Special care must be directed to the upper apex where the sliding of the flaps upon each other is necessarily slight. The flaps are held in position and gently pressed together

by delicate pads and suitable packing, my preference being for the Bernays'-Simpson tampon.

Each seam now rests upon a connective tissue support and is nowhere intersected by another. Each flap has blood supply from two sources and in the general direction of arterial flow. All denuded areas are in vascular mesoblastic tissues where repair is rapid and complete. Few sutures are needed and these are so placed that their insertion is easy. Indeed, my last case seems to prove that none is necessary, and, this being true, the most tedious part of the



Fig. C. a, The denuded cartilage left after the plastic flap is sutured to the anterior margin of the perforation. d d, The suture. The denuded area a heals by granulation.
From Dr. W. L. Ballenger's forthcoming Text Book on The Surgical and Other Diseases of the Nose, Throat and Ear.

operation is eliminated. With a little practice I believe the operation can be made as easily and quickly as the ordinary submucous resection.

Dr. W. L. Ballenger has done me the honor of describing this operation in his forthcoming text book and has kindly loaned me the three drawings made by him to accompany his description. These are herewith presented and they will aid greatly in understanding a somewhat complicated technique.

100 State Street.

THE X-RAY IN RHINOLOGY.

BY HENRY GLOVER LANGWORTHY, M. D., DUBUQUE, IOWA.

Following the introduction in America in 1895 of Professor Roentgen's discovery of the X-Ray, physicians became immediately impressed with the marvelous possibilities of such a means of diagnosis in the practice of medicine and surgery. At once skiagraphy sprang into prominence, surgeons vying with one another to perfect its use. Its application in the special fields, however, lay untouched for some years until gradually it became the routine measure of dentists in dealing with certain affections of the teeth, upper jaw and ankylosis of the inferior maxilla. Occasional cases of the localization of foreign substances within the eyeball, trachea and cesophagus were soon reported.

As early as 1902-3 the use of the X-Ray in connection with the maxillary antrum in detecting offending toothroots and the X-Raying of metal catheters placed in position in the naso-frontal duct enjoyed rather extensive use. Kassabian¹ notes that "The first skiagraph of the teeth was presented to the society of physics of Frankfort-on-the-Main, in February, 1896, by Prof. Koenig. In April of the same year Woekhoff at the Congress of Erlangen demonstrated many skiagraphs of the teeth in the living subjects." A month later Morton² showed that the structure of the teeth can be studied and many interesting conditions of the antrum of Highmore as well. In 1903 Dr. Wm. S. Haughton of Dublin exhibited some excellent stereoscopical radiograms of dried skulls. A little later Killian and Hajek in Germany began the use of X-Ray plates in normal and pathological conditions of the accessory sinuses.

Among our earliest American papers on this subject are those of Cryer³ of Philadelphia and Coakley⁴ of New York. Caldwell⁵ of New York, an expert Roentgenologist who had been doing work with Coakley in this direction, already had a very fine collection of plates. His results were excellent, the difference between a diseased and a corresponding healthy sinus being marked. 'Phaler⁷

but a short time before had shown that cerebral skiagraphy was to have a place in cranial surgery and also remarked that the accessory sinuses could be photographed as well. Cryer received his impetus in this work while on a visit to Dublin, by seeing many of Haughton's plates. Coakley says that he first observed the use of the X-Ray in Killian's clinic at Freiburg. Mosher⁸ of Boston, following Coakley's lead, soon published a paper in February, 1906, on *The Use of the X-Ray in Sinus Diseases*, in which he carefully analyzed the plates of a number of cases. Chisholm,⁹ Jack,¹⁰ Harland-Pancoast,¹¹ Scheier, Spiess and others contributed further to this subject.

It can no longer be lamented that "If surgeons who treat this region had some way of determining the character of these sinuses in the patient, then treatment could be given on a more scientific basis," as the practice of X-Raying our patients before operation has become well-nigh universal. It is rather rare in surgery for the surgeon to have beforehand an almost exact knowledge of the size, situation and outline of the structure and many of the difficulties to be encountered in connection with the sinus which he wishes to attack.¹²

In a high percentage of cases the presence of pus can also be diagnosed. One of the chief reasons which early prevented specialists from doing more of this work had been the difficulties of properly interpreting plates. As expressed by Williams¹³ the fact that "The eye must be trained in the use of the X-Ray as is the ear for osculation or percussion" was not appreciated and advances were at first necessarily slow. Another point to be borne in mind, as in the case of all observations on which a diagnosis is made, the conditions revealed by the X-Ray plate are only to be properly understood after experience has enabled the doctor to give these observations their due weight.

As "the best opportunity for the advantageous application of the X-Ray is obtained from the contrast of the normal tissue with that offered by pathological conditions of the corresponding region involving chiefly an increase in density," it is essential that one become familiar with the appearance of the picture in health. If a plate does not show contrast from one direction it may in another. Often plates are not taken to establish the presence of a diseased area, but simply to ascertain the anatomical outline and position of a certain cavity within the bone. Therefore we can at once group plates into two classes. The first to ascertain the anatomy of the

part as in a lateral plate; second those for the purpose of contrasting corresponding sinus areas to show pus (antero-posterior plate). The latter will also give some of the anatomy.

Roentgenologists tell us that the difference in resistance which air and various pathological fluids formed within the sinus in disease offer to the passage of the rays can readily be formulated. To these is added in this special region a background of bone lines and shadows which in turn must be discounted. If physical signs give more information than an X-Ray examination, so much the better. It would be a mistake to claim that an X-Ray plate is infallible. It is unfortunate that we have no tables which give the percentage of plate failures in the detection of pus. Roughly, I should say that plates will demonstrate pus or infiltrated mucous membrane in perhaps seventy per cent of frontal suppurations, eighty-five per cent ethmoidal and thirty-eight per cent antral. Plates in sphenoidal trouble have as yet been more or less unproductive in finding pus. In dealing with X-Ray plates, one must be sure that the best possible picture has been obtained and the plate not "fogged." Poor plates had better be discarded.

With regard to the value of skiagraphy as an aid in the diagnosis and treatment of disease of the accessory sinuses of the nose Coakley early published the following conclusions.

1. It is possible by means of a skiagraph to determine the presence or absence of a frontal sinus which extends vertically above the glabella.
2. A frontal sinus may be small, parallel with the upper inner margin of the orbit and hardly detected in the skiagraph.
3. In all cases of unilateral diseases of the frontal sinus verified by operation, a cloudiness has been observed in part or all of the area occupied by the sinus and an indistinctness in the outline of the cavity when compared with the opposite or healthy side.
4. The examination of a skiagraph of the two frontal sinuses when compared with results found on transillumination will aid very much in determining the presence of a diseased sinus.
5. A skiagraph may also be of considerable value in determining the height and width of the ethmoidal cell area and the sphenoidal sinuses.
6. If the plate be so arranged as to include the superior maxilla as well, a chronic separated process in an antrum often presents the same filmy appearance as noted in similar conditions of the frontal sinus and ethmoid cells. A healthy antrum presents an

irregular triangular area dark in color with a few light colored septa running through it, many of which are ridges present in the wall.

Although to this much has since been added, results show most conclusively that the value of the X-Ray has not been overestimated. Cryer states, "It has demonstrated by all who have investigated the pneumatic sinuses intimately that they exist in an indefinite variety of sizes, shapes and positions, so that even clinical experience counts for little as no two cases present like conditions. It is evident that a good radiogram, if stereoscopic, so much the better, is one of the most reliable witnesses for the surgeon's dependence in diagnosing the character and disease of the frontal sinus region."

Dentists draw attention to the fact that cases of odontalgia frequently reported are undoubtedly due to an unerupted tooth, in which cases the etiologic factor may be revealed by the X-Rays. Also patients suffering intense neuralgia with painful reflexes from the ear, nose and eye have shown pericemental and alveolar necrosis. Foreign bodies, defective root fillings, fracture and the position of metal splints can all be studied by intra-oral or extra-oral methods. Antero-posterior plates have helped me considerably in dealing with orbital abscess of suspected nasal origin. Plates in brain conditions give but little information as yet. Aneurysm of the internal carotid artery within the cavernous sinus, the result of basal skull fracture, has not been shown. Plates in double optic neuritis of possible sphenoidal etiology have yielded little.

Having been the first to suggest securing the size and outline of the sphenoidal bone in further simplifying an operative measure through the nose for septic thrombosis of the cavernous sinus, I have endeavored to tabulate the bone lines and shadow areas in lateral plates, but without much success. According to Carothers¹⁶ "Stereoscopy as applied to skiagraphy is the most improved method and would seem to give the most accurate location of a foreign body, sinus, etc. The ordinary Roentgen ray plate looks flat. The stereoscope, however, gives a prospective view much as if the parts were before one."

THE LATERAL PLATE.

Two lateral plates are required, one for each side. A diagnosis of pus is not attempted from the lateral plate. This plate shows the presence or absence of the frontal sinus, its size and the extent

or position of supra-orbital cells. Any ethmoidal cell encroaching on the frontal from either below or behind will be shown. In a general way, also, the relationship between the frontal sinus and anterior ethmoid cells can be distinguished. Mosher has observed, "If the floor of one frontal sinus is higher than the floor of the other or overlapping, the line of the higher sinus will appear in the other sinus as a horizontal ridge and may be mistaken for septa." It is not safe to try to compare a right lateral with a left lateral plate, for the reason that the respective sides of the head are seldom alike. The malar bone gives a shadow obscuring a considerable number of the anterior ethmoid cells. In good plates the position of the posterior ethmoid cells can occasionally be made out. The outline of the body of the sphenoid with its cavity is prominent. Small polypi within a frontal sinus have been shown in a lateral plate. Lateral plates may occasionally also throw light on some obstinate case of headache, where the refractive error is corrected and there seemed no reason to treat the nose. It is easily seen that if the X-Ray is of importance in choosing the best external operation they are of even greater value to those surgeons who may select an intra-nasal route in an attempt to enlarge the naso-frontal duct by the use of a burr. The X-Ray plate has done much to make such a procedure safer than it has ever been before. The lateral plate may also be used in retro-pharyngeal growths and suspected abscesses. Roentgenologists are already obtaining fair pictures of oesophageal pouches. For the lines given by the floor of the anterior canal fossa the reader is referred to any of the articles on this subject. Lateral plates require usually more study than many are willing to give them. An excellent way to begin the interpretation of bone lines is by a good resume of anatomy, with a skull in one hand and a plate in the other.

THE ANTERO-POSTERIOR PLATE.

Often after a physical examination, to clinch the diagnosis of pus in the ethmoid cells or frontal sinus, we resort to the use of the X-Ray, taking the picture of the face. This is done with the plate in front of and against the face, the rays coming from behind. In regard to the detection of pus made from this plate, it is necessary to state that the difference between a diseased and a normal sinus is so slight that a positive diagnosis must be made very carefully. As has been said, in cases of unilateral disease of the frontals or ethmoid region a cloudiness is observed in the plate. In a normal

sinus, one gets a clear general outline of sinus wall and a relatively clearer space within. In a diseased sinus, filled with pus, the side affected is more opaque than the free side and sometimes practically obliterated. The result of this process of "matching up" is then applied to the case at hand. This plate, too, shows the size of the frontal sinus and the presence of septa and orbital prolongations. In acute inflammation of the sinus if pus has drained into the nose the infiltrated mucous membrane will give a shadow on the plate. Authors have suggested following the progress of acute inflammations and granulating sinuses by taking successive plates. Infiltrated mucous membrane does not always, however, give a shadow and especially is this true in the maxillary antrum.

In conclusion it may be stated that the use of the X-Ray has done as much for the advancement of surgical rhinology as almost any hitherto single discovery in the domain of medicine or surgery. Today we are hearing much about the opsonins and especially their use in chronic suppurations. Infection, immunity and serum therapy are subjects attracting the most profound attention. It may be that a combination of X-Ray in diagnosis and opsonic serum for treatment after a proper surgical incision will stand out as one of the advances of the first quarter of the century in dealing with certain affections of the nasal sinuses.

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Temple Hall.

STRAIGHTENING THE NASAL SEPTUM.*

BY ARTHUR W. WATSON, M. D., PHILADELPHIA.

In this day of the submucous resection operation for correcting deflection of the nasal septum, the operation of straightening the septum has dropped to the background. Yet, while acknowledging that for some forms of deflection it is an admirable operation, there are those who think that the submucous operation is not without disadvantages and dangers. My own opinion is that when a deflection is corrected without resection, the patient is in a much better condition than he would have been if the framework of the septum had been removed.



Fig. 1. This Diagram accompanied the first Description of the Operation.

That such straightening can be successfully done in a majority of the cases that we meet with, is certain. All deflections which involve the lower part of the septum, generally more or less angular, both horizontal and perpendicular, including those where the end of the septum is twisted to one side; indeed, all deflections, except those of marked sigmoid character, curved deflections of the upper part of the septum and cases of considerable general thickening in narrow nasal cavities, are amenable to the straightening method.

The purpose of this paper is to call attention again to the method of straightening the septum, which I described eleven years ago before this association. I am induced to again bring forward this method, by the fact that not one of the works on diseases of the

* Read before the Twenty-ninth Annual Congress of the American Laryngological Association, Washington, D. C., May 7, 8 and 9, 1907.

nose, published since that time, has described this operation, and very few have even mentioned my name in connection with the subject, while recently several writers have claimed originality for the very methods, the overlap and the beveled incision, on which my operation was based.

I have been operating by this method for about thirteen years, and the results, in hundreds of operations, have been so good that I am still convinced that it is the best way to straighten the septum.

It is unnecessary before this association to go into the question of the causes or mode of production of deflection of the septum, or to

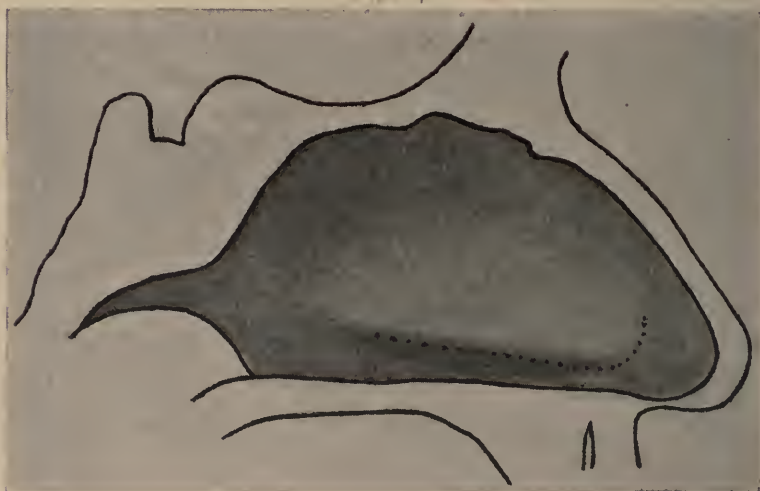


Fig. 2. Diagram showing Line of Incision in Deflection having a Horizontal Angle.

describe the different forms of deflection that we have to deal with. Suffice it to say that the chief difficulties to be overcome in any attempt to straighten a deflected septum are the redundancy of tissue and the resiliency of the cartilage. It is the want of provision to overcome these two conditions that has been the cause of failure of most of the operations devised to correct septal deflection.

In the operation which I am about to describe, by overlapping the cut edges, the movable portion overlapping the opposite side of the fixed portion, the redundancy is done away with, and also by giving a fixed support to the cartilage in its new position, the resiliency of the cartilage is counteracted. By making the incision through the cartilage beveled, or oblique, the amount of overlapping

is increased, thus increasing the resistance to the displacement of the cartilage.

The steps of the operation may be described as follows: An incision is made on the convex side of the septum, from behind forward, *just beneath* the angle of the deflection, following the angle to its anterior extremity and then curving upward for a short distance. (Fig. 2.) The incision is made on a bevel, or obliquely to the perpendicular. The incision is, by preference, not carried through the mucous membrane of the opposite, or concave, side. The upper part of the septum is then pushed over the lower portion into the opposite side, thus overlapping the lower portion. The same principle



Fig. 3. Diagram showing Lines of Incision in Deflection having both a Horizontal and Perpendicular Angle.

is applied when the angle is perpendicular, the incision then being made *behind* the angle, from above downward, the bevel being made from behind forward. An incision is also made at the base, forward from the first incision, forming a triangular flap. The posterior edge of the anterior portion is then pushed over the posterior portion. If, as frequently occurs, both a horizontal and a perpendicular angle exist, both of the incisions are made, the incisions meeting at the base. (Fig. 3.) The anterior fragment is first made to overlap the posterior, and then the upper portion, including the anterior portion, is made to overlap the basal portion. This forms a

double locking and holds the anterior portion, which has no other support, firmly and permanently in a straight line.

When the deflection extends into the bony portion of the septum, a very common condition, the bony deflection is easily broken and replaced with forceps, there being no need for cutting or overlapping of the bony portion, as when broken the fragments slide on each other and thus take up the redundancy, and as the union is bony, there is no tendency to return of the deformity.

If the septum is thickened below the horizontal angle, the thickened base, which protrudes into the formerly obstructed naris should, after the parts are healed, be dealt with as if it were a spur, by saw or forceps. If the septum is thin in the lower part, and projects unduly into the naris, it may be broken into a perpendicular position, in line with the upper portion, thus increasing the overlap and making the septum more firm, the bony base soon uniting by bony union.

After the parts have been placed in line, a folded piece of gauze, iodoform, or other antiseptic gauze, long enough to extend the length of the former deflection, and about one-third to one-half inch wide, and thick enough to just pass easily into the naris, is placed in the formerly obstructed side. This dressing is renewed about every four days, until the septum is healed—about four weeks.

The instruments used are three knives and a septum forceps,—a straight knife, like a tenotome, but with somewhat longer shank; the same with blade at an obtuse angle; and one with small blade bent on the flat, almost to a right angle, and sharp on both edges. The first two are used for the horizontal incision; the last for making the perpendicular incision. The forceps are a modification of the Adams septum forceps, the fenestrum between the blades being lengthened to an inch and a quarter, in order to be able to reach the bony part of the septum, as well as the anterior portion.

126 S. 18th St.

UPPER TRACHEOSCOPY AND BRONSCOPY.*

BY CHEVALIER JACKSON, M.D., PITTSBURG.

There are a number of ways in which upper bronchoscopy and tracheoscopy may be performed, but the simplest method is as follows:

The chloroformed patient is placed in the dorsal position with the head hanging over the edge of the table, the head being supported by an assistant in the position shown in Fig. 1.

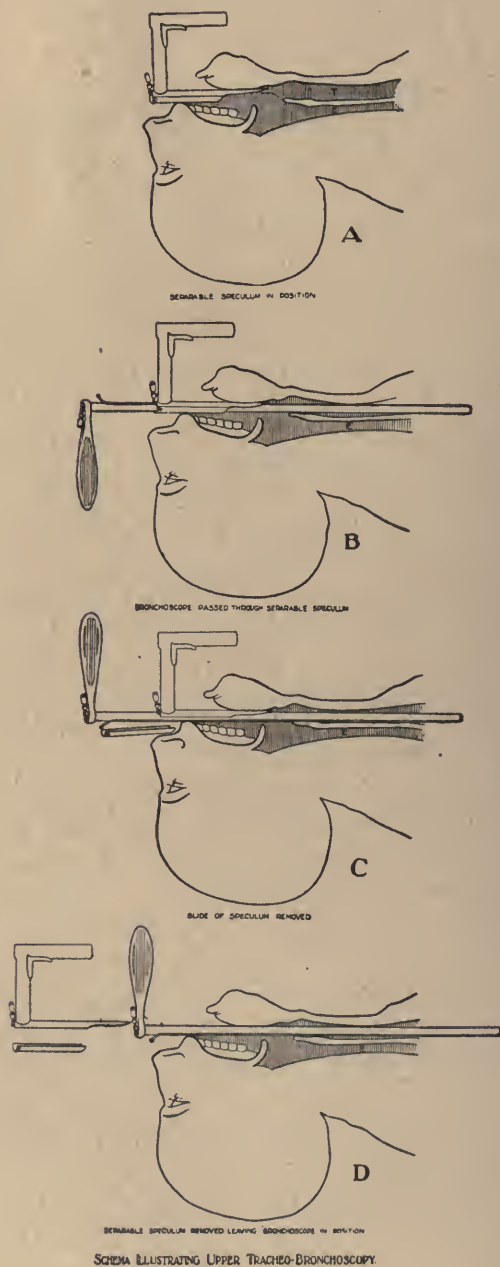
A double bronchoscopic battery is used, one cord being attached to the separable speculum and the other to the bronchoscope. The bronchoscope is held in readiness by an assistant, while the operator slides the separable speculum down over the dorsum of the tongue until the epiglottis comes into view. The epiglottis and the upper portion of the larynx may be painted over with a twenty per cent cocain solution if it is deemed necessary, which it rarely is, unless for some reason deep chloroform narcosis is contraindicated. The separable speculum is then introduced as before, and the epiglottis found. Then the epiglottis and all the tissues attached to the hyoid bone are lifted strongly with the *point* of the separable speculum. It is very necessary to lift with the point and not to use the upper teeth as a fulcrum.

When the separable speculum is in the position shown at A in Fig 2, the axis of the speculum corresponds to that of the trachea, the depths of which are seen below the vocal cords.

The bronchoscope is then introduced through the separable speculum until the tube mouth is near, but does not touch the cords. The eye is transferred to the bronchoscope and the respiratory movements of the cords are watched. When on the inspiratory excursion the bronchoscope is pushed through into the position shown in B. The gag is then inserted and the separable speculum is removed, by slipping off the slide as shown at C, leaving the bronchoscope in the trachea as shown at D.

This is by far the easiest and simplest method of introducing the tube in upper bronchoscopy. With a deeply anesthetized patient it requires in a favorable case but a minute or less to insert the

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bronchoscope. In children it is equally easy under local anesthesia. In some cases, especially those who have not normal larynges, or in whom the neck is made rigid by adhesions following the wearing of

a tracheotomy canula, it may be difficult. In cases of bilateral abductor paralysis, the cords will not separate and it is necessary to push the bronchoscope through. In such cases it is sometimes easier to pass the bronchoscope with the obturator in place as this prevents abrasion of the mucosa or the hooking of the tube mouth over one or both arytenoids. The procedure is the same except that the



eye is not transferred to the bronchoscope until the instrument, is in the trachea and the obturator is removed. No undue haste is necessary in removing the obturator as it is so made that the air may pass freely.

The latter method with the mandrin has been found easiest by some of the men I have taught, and is used by them for all cases.

The author then exhibited with the lantern a number of endoscopic views of the trachea and bronchi.

430 Park Building.

OPHTHALMOLOGICAL MANIFESTATIONS OF LATENT DISEASES OF THE NOSE AND ITS ACCESSORY SINUSES.

REPORT OF ILLUSTRATIVE CASES.*

BY FRANCIS R. PACKARD, M. D., PHILADELPHIA.

A review of the recent literature upon diseases of the accessory sinuses cannot fail to impress the reader with the increasing attention which is being paid to the ocular manifestations present in such conditions. Conversely, recent ophthalmological literature shows a correspondingly increased recognition on the part of ophthalmologists of the importance of a knowledge of the relations of sinus disease to eye trouble.

If the custom of combining the practice of otology with ophthalmology had continued there is no doubt that in view of the present important relationship between otology and rhinology the subject of the relation of intra-nasal disease to pathological conditions of the eyes would have attracted the attention it deserves at a much earlier date. Even now, although the subject is being agitated more and more, there are many oculists who seem to ignore its practical bearings in their daily work.

In the following paper, it is my desire to direct particular attention to what I consider a large and important class of cases in which latent disease of the nose and accessory sinuses manifests itself by various ophthalmological phenomena. The series of cases which I herewith present have all occurred in my practice in conjunction with Dr. Wm. Campbell Posey, of Philadelphia. Dr. Posey has already reported many of them before ophthalmological societies and in various journals.¹

In none of the cases here reported, in which the ocular findings were of the most varied character, were the nasal symptoms marked enough to direct the patient's attention to his nose as the source of

* Read before the Twenty-ninth Annual Congress of the American Laryngological Association, Washington, D. C., May 7, 8 and 9, 1907.

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his trouble. Of course, every ophthalmologist and rhinologist is familiar with the cases of orbital cellulitis due to infection from the ethmoidal cells and the mechanical effects of the presence of pus in the frontal and ethmoidal sinuses or the antrum are also sufficiently familiar.

I believe, however, that there should be more active co-relation between the ophthalmologist and the rhinologist in order to insure the recognition of the class of latent cases of nasal trouble such as are herewith presented.

Posey classifies the ocular symptoms which may occur as the result of intra-nasal sinus disease under thirteen heads, as follows:

- Disturbances in Vision and the Visual Field.
- Changes in the Orbit.
- Affections of the Lachrymal Apparatus.
- Affections of the Lids.
- Affections of the Extraocular Muscles.
- Affections of the Conjunctiva.
- Affections of the Cornea.
- Pupillary Changes.
- Affections of the Uveal Tract.
- Cataracts.
- Reflections.
- Asthenopia.
- Headaches and Neuralgia.

As will be seen, the range of such pathological conditions is a large and important one, but to the mind of the rhinologist the chief importance of the groups of cases which I report, lies in the fact that the ocular symptoms were in each instance the result of a hitherto unsuspected nasal pathological condition.

CASE 1. G. L. M., age 29 years, consulted Dr. Posey in September, 1902, because of pain over the left eye, which was worse in the morning, but passed away as the day wore on. The pain over the eye was very severe, and as it radiated into the back part of the eye, it had led his physician to send the patient to see Dr. Posey. Dr. Posey found that there were no ophthalmoscopic changes in either eye, and vision and the balance of the extraocular muscles were normal.

Dr. Posey referred him to me, and upon examination I found a marked chronic hypertrophic rhinitis, with great obstruction to the outlets of the sinuses. After contracting the tissues with cocaine and adrenalin, I was able to get away a great deal of discharge from his ethmoidal and sphenoidal cells. Several repetitions of this treatment were followed by a rapid subsidence of pain and no further ocular phenomena manifested themselves.

CASE 2. Miss A. B. was seen by Dr. Posey on the 14th of September, 1904. His report of her condition at that time was as follows:

"Miss A. B. consulted me early in the autumn, complaining of pain over the left eye, which was made worse by stooping over. The eye was described as feeling prominent and as being stiff in its socket. The ophthalmoscope revealed that the edges of the left optic nerve were everywhere hazy and that the blood vessels, especially the veins, were fuller and more tortuous than normal. Vision in the left eye equalled $\frac{5}{6}$, that in the right $\frac{5}{5}$. The difference in the vision in the eye was, however, much accentuated by the use of the Bjerrum types, the vision of the left eye being particularly affected, indicating a marked diminution in the light sense of that eye."

Dr. Posey referred her to me, as she stated she had a cold in her head for several weeks previous, and there had been a slight discharge from her nose. I wrote him the following report upon her condition at that time:

"There is considerable muco-pus discharging from the left ethmoidal and sphenoidal regions which pours over the surface of the swollen left middle turbinate and into the nasopharynx. I have seldom seen much more marked unilateral congestion in these regions than is present in this case. On the right side, although there is a condition of chronic catarrhal rhinitis, there is comparatively little swelling of the tissues, and no acute congestion in the ethmoidal and sphenoidal region. The frontal sinus and antrum are apparently not at all involved in the process."

As her trouble seemed to be entirely dependent upon her nasal condition, Dr. Posey relinquished her treatment to me. The intranasal condition soon subsided under local cleansing and the application of a mild solution of iodine and potassium iodide. She still has a slight diminution in the light sense in the left eye.

CASE 3. H. L. S., a young man, consulted Dr. Posey on February 23, 1903. He had a herpetic keratitis of a dendriform type in his right eye, consecutive to an attack of grip. At that time he suffered from an acute ethmoiditis. In February, 1905, two years later, followed another attack of grip, the right eye became re-inflamed, showing a corneal inflammation similar to that which had occurred two years previously. Dr. Posey referred him to me for examination. I found an acute purulent ethmoiditis in association with the ocular and nasal inflammation, there was a herpetic eruption over the infra-orbital branches of the 5th nerve of the affected side. After the removal of the right middle turbinate his intranasal and ocular symptoms were completely relieved.

CASE 4. B. H. B., a young man twenty-two years old, consulted Dr. Posey in February, 1905. He stated that for three months he suffered from a heavy feeling in his head and attacks of dizziness

and dull strained pain in the eyes, and occasional diplopia. Dr. Posey's examination was as follows:

"Ophthalmoscopic examination was negative; corrected vision was normal in both eyes. The upper lid of the left eye was edematous. There was a left hyperphoria of 1° and an exophoria of 2° at the far point, and of 8° at the near. Examination revealed a paresis of the left superior rectus muscle."

Upon examination of the nose I found a chronic catarrhal rhinitis with great hypertrophy of both middle turbinates. Although at that time there was no pus in any of the sinuses, the cystic condition of both middle turbinates and his history of frequent attacks of pain in his cheeks and forehead led me to suspect that he had probably suffered in the past from attacks of suppurative sinusitis. I removed the hypertrophied turbinates with the cold snare and bone forceps. Since that time he has had no further trouble.

CASE 5. Miss E. C. M. consulted Dr. Posey in September, 1906. She stated that she had been subjected to dull pain in the left eye since the preceding spring, and had also some distress in the right eye. He reported:

"Examination revealed a distinct left optic neuritis, the retinal vessels being full and tortuous and the nerve edges somewhat obscured, with an associate choking of the lymphatics on the head of the nerve. The retinal veins in the right eye were fuller than normal; vision in the right eye was normal; that in the left $5/6$, the difference being more marked when the Bjerrum type was employed."

Dr. Posey referred Miss M. to me and I reported to him as follows:

"Miss M. has a very similar condition to Miss. B. (CASE 2), except that it is more chronic. There is a hypertrophy of both middle turbinates especially marked on the left side. The left bulla ethmoidalis is much swollen. Transillumination of the sinuses revealed no indication of pus."

The condition is purely "catarrhal." In this case cauterization of the hypertrophied turbinates with chromic acid relieved her catarrhal symptoms and she has had no return of the eye pain.

CASE 6. Mr. T. D. W., age 20 years, referred to me by Dr. Posey on January 12, 1907. He had suffered from frontal headaches for eighteen months, which had been somewhat relieved by glasses prescribed by Dr. Posey about one year ago. He said that he was quite unconscious of ever having had any trouble with his nose. Dr. Posey sent him to me because, upon examination, he had found an optic neuritis upon the right side. Upon examination, I found that the patient had marked hypertrophy of the right middle turbinate, the swollen tissues impinging upon a septal deflection to the right. The swollen turbinate was not cystic, but an ordinary hypertrophied membrane. I shrunk the hypertrophied tissue with several

applications of chromic acid. It was not feasible to operate upon the septal deflection as the patient was upon the point of leaving the city.

I received the following report from Dr. Posey on March 18th:

"T. D. W. is an interesting case of ocular changes from sinusitis. The treatment which you gave him in January relieved his head pain entirely. Ophthalmoscopic examination still shows, however, a low grade neuritis upon the right side, the nasal edges of the nerve being blurred and the central lymphatics full. Mr. W. has also quite a pronounced muscular error, the eye looking on a different vertical level and showing a slight tendency towards divergence. As the degree of the vertical insufficiency varies, I think it very probable that it is dependent in a great measure upon a hyperaemia of the orbital tissues."

CASE 7. "Mr. N. B. W., age 32 years, referred to me by Dr. Posey January 10, 1907, with the accompanying report: The patient has an intense degree of hyperaemia and oedema of both optic nerves, more marked, however, upon the left side. The edges of the nerve are blurred, the retinal veins full and somewhat tortuous and the lymph passages along the walls of the retinal vessels are choked and distended. There is no intraocular cause for this appearance in the optic nerves, the retina and choroid being free from inflammation. The vision in both eyes is normal, and there is no restriction in the visual field, either for form or color. The appearance of the nerves can, I think, be explained wholly by an interference in their circulation, due to pressure at the back of the eye, such as might be evoked by a sinusitis of either the posterior ethmoidal or sphenoidal cells."

On examination I found that Mr. W. had a cystic condition of both middle turbinates. On each side they were in close contact with the septum. He told me that he had not been conscious of any nasal trouble for some years, but that when seven years old he had had a shoe button removed from his left nostril, which he had placed there some three or four years previously.

For several years subsequently to its removal he had suffered from constant catarrhal manifestations, as stated above. These had for some years entirely disappeared. The patient was also very deaf in the left ear, the hearing being diminished about $1/24$ normal for the watch. Hearing by bone conduction was much better in the left ear than in the right. The left membrana tympani was thickened and retracted.

He told me that for upwards of a year he had suffered very considerably from frontal headaches. In a number of subsequent sittings I removed the cystic middle turbinates with forceps and cold wire snare. At the end of three weeks the patient left the city. By that time he was quite free from headaches, and declared that his

nose felt so comfortable and clear that he must have been very uncomfortable before, although he was quite unconscious of it at the time.

CASE 8. Mrs. F. was referred to me by her family physician, Dr. Edward B. Hodge, on December 28, 1906. She had been a patient of Dr. Posey, who kindly furnished me with the following report of her case:

"Mrs. F. first consulted me April 10, 1906, being referred to me by her family physician, Dr. Edward B. Hodge, on account of supra-orbital headaches. Both eyes presented but a moderate amount of far-sighted astigmatism and the extraocular muscle balance was practically normal. She was given the proper correcting glasses, and her head symptoms were much relieved. On December 28, 1906, she returned, complaining of frontal pain. Examination revealed swelling and tortuosity of the retinal vessels, especially the veins. There was also a spasm of the ciliary muscles in both eyes. When account was taken of this latter factor, vision, however, was rendered normal and there was no restriction in the fields for either form or color."

This patient had a marked acute frontal sinusitis worse upon the left side, both of the middle turbinates were hypertrophic and cystic. After their ablation with the snare and forceps, her frontal sinusitis cleared up and she has had no return of her headaches.

CASE 9. Mr. W. P., referred to me by Dr. Posey in December, 1906, suffered from frontal headaches and pain in the eyes. Dr. Posey reported the case to me as follows:

"The ocular symptoms in Mr. W. P.'s case consisted in enlargement of the follicles in the retro-tarsal folds of the conjunctiva of each eye, together with an overfulness of the retinal veins. There was also more muscular asthenopia than could be accounted for by his refraction and muscular error, leading me to seek for other causes to explain his symptoms."

In this case there was a very marked ethmoiditis which subsided under a bland spray and the application of adrenalin and eucaine to the swollen tissues. After the acute condition had subsided I cauterized the hypertrophied middle turbinates which caused rapid disappearance of the symptoms.

There have been several recent American contributions to this subject. Among them I would direct particular attention to the paper of Dr. Hill Hastings.² In it Dr. Hastings reports several cases very similar in their details to those reported by me. T. H.

2. *Ann. of Otol., Rhin. and Laryngol.*, Sept. 1906

3. *Trans. Am. Laryn., Rhinol. and Otol. Assn.*, 1901.

Halsted³ reports an interesting case of sudden blindness due to damming up of pus in the sphenoid sinuses. At the same meeting Hoople⁴ presented a paper in which he stated that pressure upon the middle turbinate, whether from hypertrophy of the middle turbinate, or from a septal spur or deflection, is a very frequent cause of trouble with the ocular muscles.

Dr. C. R. Holmes⁵ last year published a long and exhaustive article on the ophthalmological complications of intra-nasal disease, in which he reports many interesting cases bearing upon this aspect of the subject.

1836 Pine.

4- Trans. Am. Laryn., Rhinol. and Otol. Assn., 1901.

5. *Ohio State Med. Journ.*, Feb. 1906.

The Management of Deaf-Mutes. MARCEL FALTA. *Archiv f. Ohrenh.*, Leipzig, Dec. 1904.

Infants begin to react to sound impressions at about the fourth week; but, in a case of the author's the child was apparently deaf until the ninth month. The use of rattles and other noise-producing toys may develop the hearing power.

Systematic instruction of deaf-mutes should begin at the age of 8 years. Careful physical examination should be made, especially of the eyes, as so much of their instruction depends on their vision. Gymnastic exercises are of the greatest importance. They develop the lungs, maintain the general health, and develop the static sense, which is often deficient in deaf-mutes. The power of recognizing the strength and even the direction of vibrations can be developed to a high degree, and serves the useful purpose of warning the deaf-mute of the approach of vehicles, etc. YANKAUER.

A CASE OF SARCOMA OF THE MAXILLARY SINUS.*

BY F. T. ROGERS, M. D., PROVIDENCE, R. I.

I desire to present this case to the section for two reasons; first, to recite briefly the remedial measures which have been followed in a peculiarly distressing case and to show the condition of the growth after seven months of active treatment and to afford an opportunity to examine a case which is not unusually rare but presents some peculiar features, and second, to gain from the discussion that may follow the ideas of the members as to the advisability of further procedure.

This patient has been under my observation for a matter of fifteen years. Specific disease in early life destroyed the septum but for a number of years there has been no recurrence of the disease. In May last he came to me with a swelling in the left maxillary region. Anticipating an empyema of the sinus, a perforation was made through the nose but nothing was obtained and later an opening was made into the antrum through the canine fossa and the present condition was found. At that time the cavity was thoroughly curetted. The growth apparently sprang from the anterior lateral wall of the sinus and was crowded over so as to completely destroy the integrity of the nose. The sinuses of the nose were exposed both to the finger and to the mirror. The inferior orbital wall had been perforated by the pressure of the growth and a considerable quantity protruded into the orbital cavity. This was also removed with the curette as completely as possible. There was no recurrence until some time in July when it rapidly began to grow worse, and early in the summer, by my advice, he consulted Dr. Coakley who gave as his opinion, that the complete abolition of the left side of the face was the only opportunity which presented itself for relief of the trouble but that he did not advise it. Later it was decided to attempt the removal of the superior maxillary bone and the operation was started with that intent. The extensive destruction of tissue, however, which was encountered, and the probable loss of the integrity of the eye and the hideous deformity which would have resulted, caused us to hesitate and after the bone had been exposed by the ordinary incision it was decided to clean the cavity as well as possible and allow the case to progress without

*Read before the Eastern Section of the American Laryngological, Rhinological and Otological Society, Providence, R. I., January 5, 1907.

further surgical interference. The wound healed kindly with the exception of the cicatricial attachments which formed under the edge of the orbit but about the second or third week it took on an exceedingly offensive odor and the growth has gone on with intervals of apparent quiescence. There is no pain and there has been very little disturbance of the general health and the condition which shows today is such that I would like you all to see. The treatment which has been followed comprises all the methods which are known to me by personal experience and from my study of the literature on the subject. He has been taking methylene blue combined with quinine and belladonna for several months. This idea was taken from Dr. Jacobi's monograph on the value of the fluorescent salts in sarcoma. The X-ray was tried with no other effect than to destroy the unpleasant odor. The Finsen ray was experimentally used with the effect of producing an erythema of the skin and undoubtedly aiding in the formation of a local abscess which followed the injection of trypsin. He has had trypsin injections up to the limit of the ampoule which contains 20 minims beginning with the smaller doses, injected into the arms, shoulder and buttocks, and small quantities were injected deeply into the growth and into the skin about the growth. One unfortunate injection in the face caused a needle abscess which gave rise to considerable pain for some days but which is the only pain he has suffered. Lately I have used the clear injectio-trypsini without diluting it, injecting it into the opening which is left in the cheek. I think, without exception, that this procedure has shown the most marked effect of any remedy which I have used. For the last month or six weeks the growth has not increased and the odor has disappeared, and it seems to me that it is in a measure smaller than it was early in December. Several times, when the growth has encroached upon the mouth it has been necessary to cut it away in order to prevent interference with swallowing and with the mastication of food, and each time that the growth has been mutilated in any way there has been an increase in the formation, very marked within the week or ten days following.

As I said before, it is not an unusual case, yet it is not so common that we can afford to neglect it and I shall be very glad to show the patient to those who are interested and later to learn your opinion as to what should further be done in the case.

117 Broad St.

A BRIEF NOTE ON THE INDICATION FOR RADICAL OPERATION ON THE NASAL ACCESSORY SINUSES.*

BY NORVAL H. PIERCE, M. D., CHICAGO.

The following paper has been inspired by a case of pansinusitis which terminated fatally after operation by a fellow practitioner and by the growing tendency on the part of some operators to too hastily deal radically with cases which in the opinion of the writer might be better treated by more conservative methods.

The remarks which follow must of necessity be general in character, as the time allowed for the reading of the papers of this program must be brief.

First, let us consider the question as to the damage to life of suppuration within the accessory sinuses without operation. Pit in his well known report of 9,000 autopsies held at Guys' Hospital reports but 1 case of death attributable to nasal suppuration. Zarinko, quoting Treitel, gives 1 extra dural abscess and 2 cerebral abscesses as of rhinal origin out of 6,000 autopsies at the Berlin Pathological Institute.

Wertheim out of 10,396 autopsies held at the Pathological Institute of Breslau gives only 6 as of rhinologic origin.

Dreyfus, in his Monograph published in 1896 collected fifty-eight cases of cerebral complications from literature of which 5 were referable to the maxillary sinus, 22 to the frontal sinus, 18 to the ethmoid cells, and 13 to the sphenoid. That is 40 of the 58 involved the fronto-ethmoid cells—the group which is by far the most frequently the starting point of grave complications.

Givens in 1900 collected 142 cerebral abscesses of which only 6 were of nasal origin.

From a consideration of the literature, therefore, we are justified in the conclusion that there is but very slight danger of encephalic complications arising in the course of either an acute or chronic sinusitis.

In contrast to this showing of cases not operated on is the rapidly swelling list of deaths following operative intervention. This phase of the subject has been recently developed in an excellent article by Dr. A. Carpait.

*Read before the Middle Section of the American Laryngological, Rhinological and Otolological Society, Cleveland, Ohio, February 22, 1907.

In 1904 Lermoyez, at the French Laryngological Society, remarked that the frontal sinus is rarely a source of danger to life so long as it is not operated on. Luc admitted that a sixth of his cases operated on by the Ogston-Luc method suffered from intracranial complications. He has therefore discarded this type of operation in favor of the Killian method. Killian's statistics give much happier results, but Copart knows of two fatalities following operation by the Killian method, and Thiel reports 1 death in 6 operations.

I will not detain you with exhaustive details of reported cases, but will simply boil the matter down to the statement that experience teaches us at the present time that the mortality of accessory sinus suppuration has been greatly increased by operation interference. The reason for this is imperfect technique, improper selection of cases, and increasing frequency of operating, since the introduction of external methods.

Naturally a clinical parallel has been drawn by the medical mind between the mastoid cells and the nasal accessory sinuses. We are now in a position to realize that this has led to erroneous conclusions. Suppuration within the mastoid is always fraught with danger on account of the immediate proximity of the sigmoid sinus, and the liability of the suppurative process to break down the membranous guards of the two fenestral with subsequent involvement of the labyrinth and extension to the cerebral contents, while thrombophlebitis and general sepsis from accessory sinus disease can occur only by extension of suppuration through intervening tissue to more or less remote venous channels. In operations on the mastoid the field is completely accessible to sight and touch. The same can scarcely be said to be always the case with the accessory sinuses. Lastly operations on the mastoid are not followed by that peculiar form of osteo-myelitis which is apt to follow operation on the accessory sinuses, especially of the fronto-ethmoid group, and which depends probably on a thrombo-phlebitis of the diploetic veins.

As with the mastoid so with the accessory nasal sinuses we may operate either to prevent dangerous complications to bring suppuration to a close, to relieve disagreeable or unbearable symptoms or to save life after the dangerous complications have arisen. But we must remember always that operations on the accessory sinuses are fraught with peculiar danger—dangers not met with in mastoid work. He will arrive at the best results who will most prudently weigh the dangers of operation as against the dangers to which

the diseased sinuses expose the patient, or as against the relief of symptoms more or less annoying, unpleasant or unbearable.

In a broad way, therefore, I believe it to be a mistake to immediately resort to radical external operations merely because the Skiagraph or intra-nasal examination discloses pus in the antrum, fronto-ethmoidal or sphenoid cells. Satisfactory results may usually be obtained by local intra-nasal procedures. Especially is this true of acute cases; and in chronic cases the external operation should be restricted to those cases which have resisted intra-nasal procedures and in which acute exacerbations show a progressive disease, or in assuming the dangers inseparably connected with radical operations on the sinuses.

31 Washington St.

New View on the Question of Adenoid Vegetation. M. V.

LANGE, de Copenhagen. *Rev. Heb. de Laryng., D'Otol. et de Rhinol.*, Feb. 23, 1907.

The author claims that the reason that we have cases of unsuccessful results after the operation for adenoid vegetations is due to the fact that these are frequently associated with hypertrophy in the naso-pharynx which persist even though somewhat ameliorated by the operation.

It is therefore important to follow the treatment of Meyer: A few days after the removal of the vegetations by the proper instruments we should commence the second part of the treatment, which consists of energetic application of fused silver nitrate by means of an applicator, following by free irrigation of warm salt water. In this way the vegetations remaining after the operation are destroyed and thus corrects the hypertrophic catarrh.

If the treatment of Meyer appears too energetic, the usual method is insufficient as it neglects the catarrh of the cavum which is often neglected while the operation is perhaps too frequent.

The author does not believe that adenoid vegetations have any influence in the majority of cases of nocturnal incontinence of urine, and believes that in such cases the treatment should be directed to the nervous system.

SCHEPPEGRELL.

AN UNUSUAL CYST OF THE LARYNX.*

BY D. CROSBY GREENE, JR., M. D., BOSTON.

Cysts of the larynx are benign tumors which, when situated on the epiglottis, are ordinarily inoffensive and may attain considerable size without producing serious disturbance. The following case which came under my observation at the Boston Children's Hospital last summer was unusual in point of size and in the resulting obstruction to breathing and swallowing which became a serious menace to the health and even the life of the patient:

ANNIE C. ———, nine years of age, was admitted to the hospital on July 27, 1906, on account of dyspnoea. The parents gave this history. The child was born prematurely at seven and a half months, but was healthy up to the age of two months. At that time she began to have a cough which had persisted fairly constantly ever since. She had never breathed quietly. For three weeks previous to her admission to the hospital her breathing had been becoming gradually more and more difficult. She had taken very little food and was rapidly losing flesh and strength. When she lay down the difficulty in breathing was increased. She slept poorly and sat up in bed most of the night.

PHYSICAL EXAMINATION. The child was small for her age, pale, emaciated and drowsy. Her breathing was open-mouthed, labored and accompanied by a loud, low-pitched, inspiratory sound, dilatation of the alae nasi and supra and infra-sternal retraction. On examination of the chest a small area of dullness was found at the base of the left lung below the angle of the scapula over which the breathing sounded harsh. External physical examination was otherwise negative.

The nose and upper pharynx presented nothing abnormal. Laryngoscopic examination disclosed a smooth bluish red, globular tumor a little over an inch in diameter involving the right half of epiglottis and the right pharyngo-epiglottic fold, in contact with the base of the tongue in front and with the posterior wall of the pharynx behind. It pushed the epiglottis well over to the left and completely concealed the cavity of the larynx. It was firm and tense to the touch and not apparently fluctuant.

*Read before the Eastern Section of the American Laryngological, Rhinological and Otological Society, Providence, R. I., January 5, 1907.

In view of the marked dyspnoea and the extremely weakened condition of the child it seemed to me advisable to perform tracheotomy before attempting to remove the tumor. Accordingly, on July 28, I did a rapid tracheotomy under light ether anaesthesia, preceded by atropine gr. 1-300 given under the skin. The child made a quick recovery from the operation and immediately began to improve not only in the ease of respiration, but in general condition. She slept comfortably for the first time in weeks, and for the first twenty-four hours after operation slept most of the time. She was still unable to take solid food but took a good quantity



Cyst of epiglottis. Drawing of laryngoscopic image enlarged. Author's case.

of liquid nourishment. Two days after the tracheotomy a change in the appearance of the tumor was noticeable: It appeared a little larger and the surface color had changed from a dusky bluish red to a yellowish hue. Against this back ground the small red ramifying surface blood vessels could be easily seen. The accompanying drawing was made for me at this time by Mr. Aitken. On August 7th, eleven days after the tracheotomy, the child having gained much in strength, I attempted to remove the tumor by means of a snare. The child was etherized in Rowe's position through the tracheotomy tube and the cyst seized with tenaculum forceps and drawn into the loop of the snare. At this point the forceps tore out, rupturing the wall of the cyst and emptying the contents, a brown fluid, into the mouth. With the collapse of the cyst the parts assumed relatively their normal position, the epiglott-

tis reverting to the median line, and I discontinued the operation. The tracheotomy tube was removed on the following day.

During the succeeding days the tumor began to develop again, and in a week was about one-half its former size, but gave no obstruction to breathing or swallowing. On August 17th, the child was again etherized and I removed a portion of the cyst wall with biting forceps. This resulted in the evacuation of about a teaspoon-



Cyst of epiglottis in two weeks' old infant. Natural size. Case of Dr. Mix. ful of pus. The cyst had evidently become infected at the first operation with some mild pyogenic organism which did not produce any systemic disturbance, for the child had no fever and gained steadily in general condition while the cyst was refilling.

Microscopic examination of the cyst wall, by Dr. H. C. Low, showed a wall of granulation tissue infiltrated by lymphocytes and polymorphonuclear leucocytes with squamous epithelium on both surfaces, i. e., a subacute inflammatory process in the wall of the retention cyst. There was no evidence of tuberculosis or indication of embryonic tissue cells. There has been no recurrence of

the tumor since the last operation. A certain amount of inflammatory swelling remained at its site for a time, but gradually diminished. Laryngoscopic examination showed only slight thickening of the right pharyngo-epiglottic fold. The child is in excellent health.

Through the courtesy of Dr. C. M. Mix of Muncie, Indiana, I am enabled to add the report of another grave case of cyst of the epiglottis which came under his observation. Dr. Mix is preparing a detailed report of this case for publication.

The patient was a newborn infant who had marked inspiratory dyspnoea from its birth. The difficulty in respiration increased up to the end of the second week, when the child died from the obstruction. At autopsy the condition was found to be as shown in the excellent photograph taken by Dr. Mix. This is the third reported case of cyst of the epiglottis in the newborn causing death which I have been able to find. It is possible, as Dr. Mix suggests, that these tumors are of more frequent occurrence in the newborn than has been supposed, and that if the profession were on the lookout for them more cases would be found.

Since 1863, when Gibb¹ first observed and operated on a cyst of the right vocal cord, a large number of cysts of the larynx have been recorded. Beschorner² in 1877, in an article reporting a case of cyst of the epiglottis, stated that in a series of 693 cases of tumors of the larynx which he had collected, 45 or about 6 per cent were cysts.

The distribution of cysts of the larynx was found by Moure³ in 117 cases to be as follows:

Epiglottis	50
Vocal cords	45
Ventricles	8
Arytenoids	4
Ary-epiglottic fold	3
Cartilage of santorini.....	1
Ventricular bands	2
Site not given	4

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Purseigle⁴, in a review of all reported cases of tumors of the epiglottis up to 1905, found that 40 per cent were cysts. These cysts are generally of small size, the great majority being not larger than a small pea. A few as large as a hazel nut have been reported.

Hamilton, of Montreal, operated on a cyst of the epiglottis as large as a small hen's egg, in a youth of sixteen years, which is, I believe, the largest on record.

Cysts have caused death from asphyxia. Edis⁷ and de Cheveney⁸ have each reported a case of congenital cyst of the epiglottis in the new born which caused dyspnoea, cyanosis and death in twelve hours. On the other hand, cysts of small size do not give rise to serious symptoms and may be carried for years without special discomfort. They may be spontaneously evacuated without leaving any trace of themselves as in three cases reported by Beshorner⁹.

In structure and origin there are three varieties:

(1) By far the most common is that due to obstruction at the mouth of a mucous gland with retention and accumulation of the secretion of the gland.

(2) A second variety has been found on the vocal cords due to accumulation of lymph either in the lymph vessel or in the lymph spaces of a polypoid growth on the cords.¹⁰

(3) The third variety includes those which are derived from embryonic tissue cells.¹¹

TREATMENT. Cysts have been cured by simple puncture or incision, but, as this method is likely to be followed by recurrence, a preferable method is removal either by means of a snare or by avulsion with forceps. Preliminary tracheotomy is only indicated with extreme dyspnoea.

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483 Beacon St.

CALCULI IN THE SALIVARY DUCTS; REPORT OF A CASE.*

BY JOSEPH S. GIBB, M. D., PHILADELPHIA.

Obstruction of a salivary duct is a condition not infrequently observed by the surgeon, a very familiar example of which is that condition called ranula. Any one of the ducts, the parotid, submaxillary or the sublingual, may be the site of the obstruction. Swelling at or near the mouth of a duct, caused by an inflammatory process, or an inspissation of the secretion, or the entrance of a foreign body into the mouth of the duct, are the usual causes of the obstruction.

The result of the obstruction is a retention of the normal secretion more or less complete, depending on the character of the obstruction, and a consequent swelling between the point of obstruction and the salivary gland. As for example, in ranula we observe a bluish-white-transparent swelling close to and at one side of the frenum linguæ, this being due to retention of the secretion of either the sublingual or submaxillary glands, or both, by some obstruction to its flow at the outlet of the duct of these glands. These, then, are the usual obstructive lesions observed in the salivary glands and their ducts. Much more rarely is seen the obstruction of a duct by the inspissation of the secretion and the deposition of salts, the normal constituents of the salivary secretion, constituting a salivary calculus.

Both of these varieties of salivary obstruction may exist for a long time without producing symptoms, and it may not be until the cyst in the one case and the calculus with the retained salivary secretion in the other becomes so large as to interfere with other functions in the mouth, that the abnormality is recognized. In some cases, however, and especially may this be so in the calculi cases, symptoms of much annoyance persist for a considerable time before the true nature of their causation is recognized.

Among the annoying symptoms may be mentioned periodic swelling in the region of the gland whose duct is the seat of the obstruction. As, for example, around the ear in case of obstruction of Steno's duct; on the floor of the mouth close to the ramus of the jaw in the case of obstruction to Wharton's duct; and on the

* Read at Meeting of the Section on Otology and Laryngology of the College of Physicians of Philadelphia, March 21, 1907.

floor of the mouth close to the frenum linguæ where the sublingual duct is obstructed. These periodic swellings are sometimes accompanied by severe pain. More frequently the sensation described is that of an unpleasant fullness, giving rise to much discomfort.

The obvious explanation for these periodic swellings and abatements is complete retention, followed by relaxation of the duct and release of the secretion. In some cases this explanation is made the more convincing by the statement of the patient, that at the time of the diminution of the swelling there is always a coincident outpouring of saliva into the mouth, as was stated by the patient whose case is reported tonight.

While the symptoms caused by the obstruction to a salivary duct is usually as stated, more of discomfort than pain, there are records of cases in which serious and urgent symptoms have accompanied it. Myles¹ reports the case of "a very stout man, with a short, thick neck, in whom there was serious interference with respiration. The epiglottis was swollen and pressed up by a large teat-like swelling on the lowermost part of the base of the tongue. A small fistula was to be seen in the floor of the mouth near the last molar tooth. The oedematous epiglottis was incised in several places with a protected laryngeal bistoury, and the swelling rapidly subsided to about half its former size. The projection at the base of the tongue was seized with a lingual tonsillotome and its apex cut away. It contained a burrowing cystic abscess filled with salivary and muco-purulent secretion. All the alarming symptoms rapidly subsided." Later, by bi-manual palpation and probing, he was able to detect a calculus in the submaxillary gland. This latter was removed in small pieces by dilating the duct and curetting. The symptoms were entirely relieved and the patient recovered.

The etiology of salivary calculi is obscure; there are probably several causes. Alteration of the secretion in the gland, causing inspissation, is a factor. This may arise from inflammatory or other initiative processes. Diminution of the normal calibre of the duct of a salivary gland from an inflammatory process, thereby retarding the natural flow and causing inspissation of the secretion and deposition of salts. The entrance of a foreign body into the duct, serving as the nucleus for the deposition of the normal salts of the salivary secretion, has been dwelt upon by some observers. The

¹Myles. THE LARYNGOSCOPE, December, 1904, p. 916.

more modern views as to the causation of diseased processes, namely, by the intervention of bacteria, prevail here, and are the most commonly accepted by recent investigators.

An infectious process is inaugurated at some point in the gland or along the duct, which is invaded with myriads of bacteria; a collection of these bacteria form the nucleus of the stone. This condition has been verified by numerous observers. The bacteria found have been those which are usually found in the mouth under normal conditions.

The composition of a salivary calculus is both organic and inorganic. The nucleus is apt to be a cluster of bacteria or a foreign body surrounded by myriads of bacteria; superimposed upon this mass is layer upon layer of the usual salts found in saliva—mostly phosphate of lime. Calculi are of varying sizes and shapes; those in the glands are usually larger and more numerous than those in the ducts. Glandular calculi are also more irregular in their contour. Calculi in the ducts are more or less round in shape and vary in size from a millet seed to a grain of corn, or even larger.

The diagnosis of calculi is attended with some difficulty, since the cases are often obscure in the early part of their course. Unilateral swelling, often of an intermittent character, in the neighborhood of a salivary gland, should excite the suspicion that such an abnormality existed. This suspicion should lead to a careful examination along the course of the duct whose gland is the seat of swelling. If there is not too great oedema around the duct so that the calculi is imbedded, its presence will be detected by this means of examination.

The obvious treatment of calculi of the salivary duct is complete removal of the obstruction from the duct with as little injury as possible to the caliber of the duct and the surrounding mucous membrane, and an endeavor to effect a normal condition of the duct. Whenever possible the removal of the stone must be through the mouth. To accomplish this purpose, the calculus is grasped between the thumb and finger of one hand and the mucous membrane made tense over its surface. This incision is then carried down to the stone and the latter made to engage in it, from whence it is carefully extracted. Likely adhesions have formed around the stone and it is not so easily extracted as this description would seem to indicate. Care in dissection, however, will enable us in most cases to extract with little trouble. If very large, the stone may be crushed by a hemostat or other strong forcep and extracted piecemeal.

An effort should be made to find the duct and determine whether or not a stricture or any other condition diminishing its caliber exists. Should the duct be found abnormally contracted dilatation by means of graduated bougies may be employed. The wound made by the incision generally heals quickly.

Salivary fistulæ are a very unusual complication, but the possibility of such an accident should be borne in mind, because in some localities, e. g., in Steno's duct, it would be an unfortunate and disagreeable complication.

These desultory remarks have been suggested by the case, whose history is as follows:

J. W., aet. 27, came to see me because of a sore throat and an uncomfortable sensation below the angle of the jaw on the left side.

He stated that for a long time, perhaps a year or more, he has had discomfort at the angle of the jaw, accompanied by swelling below the angle and on the inner side of the jaw and floor of the mouth. This has not been continuous, but seemed to come on in attacks which would last for a time and then almost suddenly disappear.

He noticed that at the time of the subsidence of the swelling there was an unusual flow of saliva in the mouth.

These attacks, as he called them, seemed to come with increasing frequency, and the discomfort became more and more distressing, so that he became alarmed and decided to consult a physician.

Upon examination around the angle of the jaw, both inside and outside, no area of tenderness or swelling could be found.

From the history, however, it was thought there might be some interference with the function of the salivary glands, hence the finger was passed inside of the mouth from the angle of the jaw across the floor of the mouth in the direction taken by Wharton's duct. Almost at once the finger was arrested by the presence of a hard, unyielding body. This was found to be located on the floor of the mouth, midway between the inner surface of the ramus of jaw and the frenum linguæ.

The mucous membrane around and over the foreign body was well cocaineized and the body grasped between the forefinger and thumb, making the mucous membrane tense. An incision was made down to the foreign body, which was found to be a calculus. Some difficulty was encountered in separating it from its bed, but after a little manipulation this was successfully accomplished and the stone removed.

The wound in the mucous membrane and duct healed promptly and the patient made an uninterrupted recovery. All the unpleasant symptoms disappeared and the patient has since remained well.

1907 Chestnut St.

A RARE NASAL TUMOR. FIBROMA OF THE POSTERIOR END OF THE MIDDLE TURBINATE. REPORT OF CASE.

BY WILLIAM C. BRAISLIN, M.D., BROOKLYN, N. Y.

Jonathan Wright says, in his article on Neoplasms of the Upper Air Passages¹: "While it occasionally occurs in and about the naso-pharynx, fibroma springing from the nasal structures is exceedingly rare." In 32,997 patients examined, only two fibromata of the nose appeared. Dr. Wright kindly examined the tumor here reported, and his comments on the case give me the reason for reporting the same.

Mrs. C. K., 35 years of age, was first seen September 12, 1905. She complained of a decided obstruction in her nose dating from the preceding winter—that is, for a period of something over six months. There was an uncomfortable feeling in the throat which she described as causing a great deal of mucus to collect there.

On examination, a large pinkish-white mass presented in the pharynx, projecting more or less from beneath the free border of the soft palate as the palatal muscles contracted or relaxed. On dilating the right side of the nose under cocain, the pedicle could be seen at the under surface of the middle turbinate, well posteriorly.

The tumor was grasped with a blunt-edged adenoid forceps, introduced through the mouth up behind the soft palate, and removed entire from the base of its pedicle. It was approximately 2 inch by 1 inch by $\frac{1}{2}$ inch, or irregular shape, indented and moulded by the posterior nasal meatus and the pharyngeal space. Its outline was not unlike a hammer-head; one thick projecting portion had extended into the vault, the other and larger had hung pendant downward into the pharynx toward the base of the tongue. The pedicular portion, which had led into the posterior nares to its attachment, shows the impress of the middle turbinate.

Five weeks subsequently another small mass was removed from the same region, through the nose. This had every appearance of a mucous polyp, and was so pronounced by Dr. Wright.

Dr. Wright's opinion of the large tumor is that it is certainly **a fibroma**. There are a number of cellular elements in it; however, it is not so dense as the other one (Knight's case) examined by him and figured in his article referred to.

¹ Am. Text-Book of Diseases of the Eye, Ear, Nose and Throat, p. 1080.

SOCIETY PROCEEDINGS.

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY.

Regular Meeting May 21, 1907.

J. HOLINGER, M. D., President.

PRESENTATION OF CASES.

Auastomosis of the Facial with the Hypoglossal Nerve. By
JOSEPH C. BECK, M. D.

The case was one of angio-endothelioma of the middle ear, involving the facial nerve, in which a radical operation was done a year ago. A secondary operation was done on the facio-hypoglossal nerve, the anastomosis being made by implanting the facial into the hypoglossal seven weeks ago. Contraction is beginning to appear in the lower facial muscle. A recurrence of the tumor was also removed at the same time. Since then there has been no recurrence. The hypoglossal nerve was situated low down and considerable traction had to be exerted to effect the anastomosis; hence the nerve was kinked and this was the cause of this partial paralysis of the tongue. The patient was shown at this time, owing to the fact that this was the last meeting of the society this season, and the doctor wanted the members of the society to see this case at this time, so as to be able to compare the result next fall at another meeting. He will then exhibit the three cases operated successfully up to date.

DISCUSSION.

DR. JOHN G. WILSON: It is not possible to get the functional union of the facial nerve with the hypoglossal by merely laying the former along the side of the latter. What is necessary is to implant the peripheral end of the facial on to the central end of a part or the whole of the hypoglossal. To do this some fibres of the hypoglossal must be cut. So the paralysis Dr. Beck refers to as a flaw in his results, could not possibly be avoided; on the contrary he is to be congratulated that the resulting paralysis is so slight.

DR. BECK, closing the discussion: Dr. Wilson saw the first case I operated on and pronounced it a good result, and yet there was no paralysis. I did what I attempted to do in this case—implant the facial stump into the hypoglossal, turning it upward, so that the fibers from the hypoglossal would carry stimuli to the facial stump.

PRESENTATION OF PAPERS.

The Present State of our Knowledge with Regard to the Physiology of the Sinuses Accessory to the Nose. By J. GORDON WILSON, M. A, M. B., (Edin.)

The various hypotheses that have been advanced from time to time to explain the presence of the accessory sinuses of the nose make an interesting chapter in the history of medicine. From the early period when they first attracted notice down to the present time more or less plausible theories have been in vogue. Thus, they have been supposed to serve to secrete mucus. But the position of the nasal openings of the principal sinuses is obviously opposed to such an hypothesis, to say nothing of the fact that under normal conditions mucus is not present in these sinuses. They have been held to be necessary to produce a sonorous voice. Especially was this supposed to be the case in regard to the frontal sinus; but the irregularities in its shape and the fact that it may be absent with no apparent alteration in vocal resonance, as well as its more or less obliteration in pathological cases with no apparent change of voice, require the abandonment of this theory. In the *Orang, Zuckermandl* states that at one time he thought it possible that the large sinus maxillaris there present might act as a resonator; but the inconstancy of its formation led him to abandon this supposition.

Before discussing more recent views of the physiology of the accessory sinuses it may be well to recall certain facts with regard to their embryology and some points in regard to the physiology of the nasal cavity, which bear on this problem.

1. EMBRYOLOGY: The accessory sinuses are produced by the projection outwards of the nasal cavity. In the mesoderm which surrounds the primitive nasal cavity there is formed within its interorbital septum a cartilaginous plate with openings for the branches of the olfactory nerve. This plate sends down two cartilaginous laminae to form the side walls of the nose, and a medial plate dividing the nasal cavity into two parts. The ends of these cartilaginous side walls, and the ridges which appear on it, form the embryonic chief turbinates. Lying in these furrows between the ridges one notes accessory turbinates formed in the same way and separated by accessory furrows. In the course of development the embryonic chief turbinates are reduced in number to three or four.

The sinuses are developed by a widening out of the accessory furrows. This is especially well seen in the frontal sinus, which devel-

opes from a depression in the furrow which lies between the first and second embryonic turbinates. By the increase and growth of this into the frontal bone the frontal sinus is formed. At birth it is not present and only begins to appear as other than a slight depression about the sixth or seventh year. The sphenoidal sinus arises in the posterior part of the nasal cavity and by some has been regarded as the posterior part of the primitive nasal cavity enclosed in bone, by others as a depression which invades the body of the sphenoid. The maxillary sinus is foreshadowed by a small depression which is easily seen at birth on the side wall, in the furrow between the horizontal part of the first and second turbinates. The ethmoid cells arise from the anterior part of the chief embryonic furrows. In these the accessory turbinates and furrows widen irregularly, the tops of the furrows adhere more or less closely to form primitive chambers. The final state of the pneumatic chambers differs. Whilst the frontal, sphenoidal and maxillary press into the skull capsule, the ethmoidal are limited as a rule to the cartilage and bone from which they started, though occasionally they may invade the adjoining bones. It has to be noted that though the primitive ethmoidal cells have olfactory epithelium, the secondary never have. The frontal, sphenoidal and maxillary sinuses never have olfactory epithelium.

II. COMPARATIVE ANATOMY: Comparative anatomy shows how widely distributed pneumatic chambers are, how large they may become, and what a variety of purposes they may serve. In birds, where they are well developed, their function has been the subject of much controversy. Generally the skeletons of large birds that fly well (Storke and Swans) are most pneumatic; but there are many exceptions. Thus the bones of the Swifts are solid and the air cells are chiefly confined to the cranium; many parts of the skeleton of the large Ratitae are very pneumatic. Some of the air sacs are for sexual adornment (Bustards); others act as resonators (Prairie Fowl); others serve as reservoirs for air (Lark and Nightingale). But their principal function seems to be to assist the respiratory mechanism by "ventilating the lungs and to regulate the exhalation of the watery vapor" (Newton).

In mammals in addition to those found in man, there may be others present. Thus in the deer they are present in the palate bone. They are very large in animals with massive heads, e. g., the elephant. The deduction one must make from a comparative study is that these cavities enlarge, with the least degree of weight, the osseous areas necessary to these animals. At the same time one

notes that animals with perfect smelling apparatus have very large ethmoidal cells, which outweigh the frontal and sphenoidal sinuses; and that animals with very little smell have the ethmoidal cells reduced in size or may even have them absent.

III. PHYSIOLOGY: There are four hypothesis in regard to the physiology of the accessory sinuses that I wish to discuss.

1. That they supply warmth and moisture to the inspired air.

2. That they are olfactory cavities.

3. That their position causes a passage of air over the olfactory mucous membrane.

4. That they lighten and increase the mobility of the head.

1. *That they supply warmth and moisture to the inspired air.*—

All acknowledge the advantage of nasal respiration and recognize that the inspired air receives heat and moisture. We have very good proof that this is the function of the turbinates. We have no reason to believe that the accessory sinuses play any part in this, but on the contrary we have, I believe, very good proof that they have little or no effect on the change. In the first place, the mucous membrane of the sinuses is very thin and poorly supplied with glands and blood vessels. Again, the cavities themselves are relatively too small to have any perceptible effect even supposing they were capable of being sucked dry; I believe the amount of air that passes out during inspiration is relatively small. In short, it appears to me that the supply of warmth and moisture they are capable of giving as cavities is practically negligible.

2. *That they act as olfactory chambers.*—As opposed to this one finds that the olfactory nerve has no endings there; that the lower apes and children in whom smell is present have no sinuses; and that anosmatic animals possess sinuses. Against this not one positive fact can be advanced to support this hypothesis.

3. *That their position causes a passage of air over the olfactory mucous membrane.*—This theory is based principally on the experiments of Braun and Classen, who showed that there was considerable variation in pressure during respiration in the chambers accessory to the nose; and concluded that while in normal respiration the air does not pass over the olfactory region, yet the secondary current resulting from this variation would carry odorous particles to the olfactory mucous membrane. There are many objections to this hypothesis. Thus acknowledging that secondary currents exist, it was not shown how those related to the frontal and maxillary sinuses could affect the olfactory mucous membrane. Further, if the sinuses play so important a part in smell, it is difficult to

understand why in man they develop so late in life and may even fail on one side without compensatory enlargement on the other; also why in some of the apes they are poorly developed and sometimes not present.

4. *That they lighten and increase the mobility of the head.*—The study of comparative anatomy strongly favors the view that pneumatization of bones is for the purpose of combining strength with lightness. This is well seen in the larger mammals. For instance, in the elephant, where the massive head with its relatively small cranial contents has to give powerful insertions to a musculature which will move the head and trunk, we find the air chambers of huge proportions. In the apes the small head with the small cranial contents and the reduced amount of musculature is associated with a diminution and in some cases an absence of sinuses. In man, the increased size of the brain to be protected and supported, is accompanied by increase in the size of the sinuses.

At present the weight of evidence appears to me to support this hypothesis. Yet there are some points which make one hesitate to assert dogmatically that this is their only function. Chief among these is the fact that developmentally they are the outgrowths of the nasal cavity—respiratory or olfactory. A complete solution can only be hoped for, from a study of embryology and comparative physiology.

DISCUSSION.

DR. E. FLETCHER INGALS: This Society is to be congratulated on having a member who is willing to devote his time to research in a subject about which we know so little, and need to know so much.

DR. CHARLES M. ROBERTSON: I do not quite understand the litmus paper experiment. It seems to me that if the doctor put litmus paper into the opening made in the frontal sinus, air would pass through there during inspiration.

DR. WILSON: The glass tube is put in air-tight, so that no air can get in.

DR. ROBERTSON: As regards the function of the accessory sinuses, aiding in the resonance of the voice, the only way to determine that would be by making a photograph of the sounds, which is done by the sound waves producing vibrations and recording them on an apparatus made for that purpose. I think that the presence of anything in the nose certainly does impair the resonance and it has always seemed to me that the accessory sinuses were particularly adapted to increasing the resonance in the voice.

So far as the olfactory function is concerned, I am sure that no olfactory nerve filaments are to be found in the membrane lining these cavities. As for warming the air that is inspired, one can see how that would be possible if the air came in contact with the mucous membrane, but if these accessory sinuses possess any function at all, it is probably that of regulating the resonance of the voice.

DR. EDWIN PYNCHON: It seems to me that one of the functions of the sinuses is to lighten the bone in such a way that the brain does not suffer by concussion in case of external injury.

As regards the influence of the sinuses upon vocal resonance, they undoubtedly contribute much to this purpose. Of all races, the Africans have sinuses as large as any, and the singing voice of the African is known to be very melodious.

As regards the function of warming and moistening the air, it appeals to me very strongly. In fact, I fully believe that this is the chief and principal function of the sinuses.

As regards the direction of the air current in inspiration and expiration, it is well known from investigation made by Freeman, of Philadelphia, and others, that the inspired air passes chiefly about the middle turbinal. In fact, as it strikes the middle turbinal it is divided so a portion thereof goes through the superior meatus. Why does the air go in this direction? The openings or anterior nares are almost horizontal and if air is drawn in slowly, it may not take that direction, whereas when it is drawn in quickly it will go toward the roof of the nose. Why is it that the air goes out through the lower part of the nose in expiration? The air in its outward passage strikes the vault of the nasal space, which tends to direct the current toward the inferior meatus.

DR. J. HOLLINGER: The function of the accessory sinuses of the nose in one animal cannot be compared with the functions in every other animal. Take, for example, the elephant, where the system of frontal sinuses is developed to such an extent that the whole front and upper part of the immense skull is a mass of sinuses. The object undoubtedly is to create a large crest over the back of the head for the insertion of the muscles of the neck, governing the motion of the trunk. The function of the sinuses is merely an architectural question because of the need of a large place of insertion for these muscles.

Another point is the great difference in size and relative position of the sinuses existing among the various races of men. I think we hardly made a fair test in the investigation of these problems

by taking accurate measurements of the width and height of the face compared with the width and height of the nose. This so far has produced no other result than to show that the width of the face is proportionate to the width of the nose. In other words, that the width of the maxillary sinuses are equally proportionate to the width of the face. There are such great differences in the architecture of the skulls of different races that I think we might by comparing those factors get at the points equally as well as by comparing the skulls of the different animals.

DR. WILLIAM L. BALLENGER: I want to ask Dr. Wilson a question. We are at times placed in a position where we must operate on these sinuses. From a physiologic point of view, what harm might result from a complete exenteration of the ethmoidal sinus?

I frequently have had patients where, after removing the ethmoidal cells, the sense of smell was instantly restored. Of course, that was because of closure of the olfactory fissure before operation, and the diffusion of odoriferous particles did not take place.

DR. WILSON, closing the discussion: I am very glad that my paper has elicited such free expression of opinion on this subject. Of course, my investigations have just started. On looking up the literature on physiology of the sinuses, it proved to be very small in amount. In discussing the subject one has to remember that it is not enough to frame an hypothesis which may appear satisfactory in one or two animals, or even in man. What we want is a theory that will be generally applicable to these accessory sinuses. The theory which best satisfies these conditions at present is the one which holds that these sinuses lighten the weight of the head and increase its mobility. To object to such a theory by statements based on belief in the efficacy of some other hypothesis is not enough. For instance, it is not enough to say that one believes that the lining membrane of these sinuses imparts warmth and moisture to the inspired air. One must give foundations for the belief.

As to the question of these being vestigial remains of olfactory organs, I do not know that that will help us out. Simply to mention such looks to me like begging the question. So far, not the slightest proof has been advanced in support of this contention.

Dr. Pyncheon raises an important point when he draws attention to the question of the projection of the superciliary ridges as an index of the size of the frontal sinuses. That their size may bear some relation to the size of the sinus one must acknowledge, but to regard them as indices would be, it appears to me, to attach undue

importance to their prominence and inevitably lead to miscalculations. Anatomically one may find large ridges and by no means corresponding large sinuses; to give but one example, negroes have marked superciliary ridges, but as a rule small frontal sinuses. The other point Dr. Pyncheon raises, that normally the main current of inspired air rises as high as the superior turbinal, I cannot agree with. I should place it in relation to the middle turbinal.

I have left Dr. Robertson's remarks to the last, since I recognize here a difficulty in giving satisfactory proof. We have no evidence that these sinuses act as resonators. As cavities accessory to the nose they may secondarily do so by modifying the amount of air space in the upper passages so as to affect resonance. Their position, their variations in size, the character of their openings speak against their main function being resonating cavities; and in addition the true resonators are developed in relation to the sound producing organ—the larynx. I do not know that the voice has been photographed before and after sinus operations.

I have been asked what harm could come from removal of the ethmoidal sinus. Speaking generally, one would say that the primary harm would come from the destruction of the olfactory mucous membrane, necessitating injury to its lymphatics, which connect so closely with the subarachnoid and subdural spaces. Further, the relation of the posterior ethmoidal cells with the optic nerve has to be thought of.

What Constitutes an Adequate Preparation for Practice in a Special Field. By GEO. E. SHAMBAUGH, M. D.

Work in the several special fields has been carried so far beyond the scope of the work that the internist is prepared to do that the necessity for special training for the men entering the practice of the specialties is apparent. The development of the specialties has come about so rapidly that this demand for special training is necessarily a recent one. It presents a problem in medical education we have not yet solved. A few weeks or months attendance on clinics in our so-called post graduate schools does not in any measure constitute an adequate preparation for the men entering the practice of a specialty. The training of the specialist should be as much in the fundamental sciences of his speciality as in the clinical side. In the training of the general practitioner we require a knowledge of general anatomy, general physiology, embryology and pathology. It is just as essential that the specialist in order to have a

clear understanding of the clinical problem of his specialty should have a thorough training in the special anatomy, the special physiology, embryology and pathology of the field with which he has to deal.

This work should be put on the basis of genuine graduate work; that is, it should lead up to the frontier line where the actual research is being done and where the unsolved problem in the subject can be presented and discussed. This work can be properly done only in our universities. It could be so arranged as to lead to the granting by the university of a higher degree in medicine, the degree of doctor of Philosophy, for example, in Ophthalmology, or in Otology, just as is now being done for the men working in the other sciences, as physics, chemistry, etc. The offering of such courses even by one or two of our best equipped universities would serve to stimulate higher ideals and better preparations in physicians all over the country entering upon the practice of the specialties. Our great need is not for more specialists, but for properly trained specialists.

DISCUSSION.

DR. NORVAL H. PIERCE: I have been teaching in post-graduate work for over fifteen years, and I very soon found how inadequate such work is. It is a shame that in this great city post-graduate work has gone to such absolute misuse. That it is foolish for a man to come here and study six weeks at the most and expect to master a specialty that requires at least considerable manipulative dexterity is apparent. I do not recall a single instance where I have regarded the work done by such men who came to my clinics as in any way satisfactory either to me or to those men for their trouble. It is largely a waste of time. There is neither beginning nor end. It is all chaos. I am sure that every man who has had any experience in this line of work will agree with me the time has come when such a paper as Dr. Shambaugh's is exceedingly timely.

How many of us are familiar with the science of sound? How many of us realize the difference between mass vibration and molecular vibration? How essential these problems are to the comprehension of our daily work? Therefore, I am in hearty sympathy with the proposition that physics as relating to sound should be a requisite in the training of the otologist, as much so as is the embryology and the anatomy of the parts. I wish to voice my appreciation to Dr. Shambaugh for this timely paper.

DR. J. G. WILSON: We are all agreed, Mr. President, that the improvement of the post-graduate instruction is one of the most urgent needs in present day medical education. This Society ought to do all in its power to further the object that Dr. Shambaugh has so well stated in his paper. I feel confident that if a representative body of medical men in Chicago should ask the universities in the state to assist in the advancement of post-graduate work, these universities would listen with a great deal of sympathy to the request. But the sincerity of the request must be evident in the hearty, unselfish cooperation of each society and of each school. To attain to this we require to educate not only the general practitioner, but the specialist, and I look upon Dr. Shambaugh's paper as a necessary step in that direction. So far as a special degree is concerned, I regard that of less importance. No doubt such a degree would give a hallmark to a man, indicating what he has done; but I believe its possession would be apt to be over-estimated. What is wanted at present is opportunity to work in the branches directly bearing on our specialties. Is it not possible to have all the schools in Chicago, interested in Laryngology and Otology, agree to organize and recommend to their graduate students special lectures on scientific subjects and special practical courses in anatomy, physiology and pathology, bearing directly on these special subjects, such lectures and courses to be given by competent men, who should receive sufficient remuneration? Such courses might very well fit in with, and form a valuable adjunct to, the clinical instruction which these schools are at present so well giving.

DR. C. M. ROBERTSON: It is a shame that men can come to this city and take up a specialty, stay six weeks or even less, and then feel that they have mastered it all. There is a movement on foot now in the University of Chicago, where Dr. Shambaugh and Dr. Pusey are doing work of this kind, and in the Northwestern University there is under advisement at the present time a course to elaborate such a scheme as this. The only question is, how much can you force the under-graduate student to do in this work, and also how can you teach post-graduate work in the under-graduate school?

As regards post-graduate teaching, men do not care to spend more than six weeks here, although the facilities for teaching are just as good as they are elsewhere. Many of these men go to Germany, even though they do not speak or understand German. It seems to me that the post-graduate schools of this city are at the

end of their string. That is shown by the fewer number of students coming here. They are not coming because they can get better work elsewhere, and yet our facilities are the equal of any. It seems to me that courses in pathology, physiology and anatomy are very essential. I tried to arrange such a course in the polyclinic, but when I submitted it, all the men in the school jumped on me and said that I was trying to advance myself at the expense of others. So I dropped it.

Every member of this Society ought to bring his influence to bear on the colleges of this city, so that every man might take up a certain amount of work, if desired, and become proficient in it. If he inclines to laboratory work, let him become an expert in that work. So, too, with clinical and dead-house work. The universities all seem willing to do it, and some of the post-graduate schools do it. Those that are run for profit may not be willing to do this, but even if they are not, the students would go to schools where they can get the work they are after.

DR. JOSEPH C. BECK: The solution that appeals to me is one recommended by Dr. Price, of Philadelphia, a gynecologist of note. He believes that every specialist should take into his services a young graduate and teach him his specialty. I have followed this method ever since I have been practicing a specialty, keeping the young man with me for at least three years. The third man is still assisting me, and a second man has begun his course. I consider the first man a specialist. I believe Dr. Shambaugh's suggestions are excellent. Every man contemplating special work should take up anatomy, pathology and physiology as outlined by Dr. Shambaugh. I would suggest, with reference to pathology, that we are very negligent in not studying the tissues which we remove but throw away. Of course, we have not time to work them up, but I am sure that it would be possible to have the student whom one is developing as a specialist examine all tissues. That would do much for hysto-pathology.

In regard to the education of post-graduates, it has been my experience that these men are particularly interested in the removal of the tonsils and adenoids, and the use of the spray. Pathology and diagnosis is sadly neglected. If there are not enough schools to train specialists, there are plenty of specialists who can do this work.

DR. J. HOLINGER: There is one point which I think we overlooked, and that is the financial question. If a man has devoted himself up to his twenty-fifth year to the study of medicine, he cannot,

as a rule, afford to work two or three years without any remuneration, and at an increased expense to himself. The undergraduate student can live cheaply, but after graduation he cannot do this. He must have a good appearance and he must live in good quarters. Therefore, assistants in large clinics ought to be paid some salary. The attending men also ought to obtain some compensation that he can give a certain amount of time to this work of training competent assistants.

DR. SHAMBAUGH, closing the discussion: I am, of course, much pleased with the discussion my paper has received, and most of all because it has brought out the fact that we are more or less of the same opinion in regard to the need for more adequate instruction to the men entering the practice of our specialty. This field of graduate work is a comparatively new one, and the problem of giving proper training is still to be solved. I am a firm believer that in the solution of this problem, Chicago will play an important part. The discussion of this evening shows that the men in this Society have the first requisite necessary to bring about a proper solution of the question, i. e., we have an appreciation of the great need for such work. The men in this city who would participate in the development of proper graduate training for the prospective specialist must realize first of all that it will be expected of them to devote enough time and thought to some particular branch of our work, so as to command from others the recognition that they are an authority in this particular thing. One thing certain, the men of this country who are entering specialties and limit their preparation to a six weeks' post-graduate course or to a few months' trip abroad are not adequately prepared. The mere hanging out of a sign does not make a specialist of a general practitioner. We are coming very rapidly to the stage where to be recognized as a specialist the physician will be expected to have made a careful study of some branch of the specialty that he will be able to make a contribution to our knowledge of this field. It is not material that this contribution should have a special practical bearing as far as we are able to see at this time. A specialist who makes a contribution to the embryology or the histology of a part of the organ we have to deal with must of necessity have familiarized himself in a large measure with the whole anatomy of this region; otherwise he would be unable to prosecute successfully any piece of research, however technical.

BOOK REVIEWS.

Tracheo-Bronchoscopy, Esophagoscopy and Gastroscopy.

By DR. CHEVALIER JACKSON, Pittsburg, Pa., Large octavo, 200 pages, 83 illustrations, 5 full-page colored plates, bound in cloth. Price, \$4.00 *net* (Foreign, 17 sh., 17 mk., 21 fr.). Sold only by Subscription direct to the Publishers—THE LARYNGSCOPE Co., 3858 Westminster Pl., St. Louis, Mo., 1907.

The visit to this country last June of Prof. Killian, the discoverer of bronchoscopy, his brilliant operating, his painstaking demonstrations and his winning personality aroused great interest in the instrumental examination of the trachea and the bronchi and of the esophagus. At that time it was very gratifying to the American specialists that one of their number had something worthy of the cause to show Prof. Killian in return. Dr. Chevalier Jackson did this by his demonstration of the instrumental examination of the whole of the interior of the stomach and his exposition of its far-reaching possibilities for diagnosis and treatment. It is an added source of gratification that within the month Dr. Jackson has issued the first book on the subject of gastroscopy and its allied subjects, esophagoscopy and bronchoscopy.

Seldom has a medical book been more timely. Besides being the only book on the subject, it is a most excellent one. It is well printed, well illustrated, thoroughly indexed and contains a complete bibliography. The men who have done work along similar lines with the author will find their work credited to them in this book and given a good setting. As this class of work is based upon special instruments and upon special methods of instrumentation, the author has gone into all mechanical details carefully and minutely. Operating room arrangements have been described and illustrated in order that the operative procedures may be carried out in the most orderly manner. Only those who have attempted to do this kind of operating know how easily confusion and aimless manipulation may creep in.

The bronchoscope which bears Jackson's name is, as he states, the esophagoscope of Einhorn transferred to the trachea. Jackson modestly sets forth the advantages of the self illuminated tube and courteously gives, due praise to the Killian tube which is lighted from the far end. I feel strongly that the self illuminated tube is much the better. The writer says very pertinently that if you are dealing with electricity you must take the trouble to learn something about it. Those who neglect to do this should not be astonished if their apparatus balks. Operators who are not willing to look after details of mechanism would do better to let bronchoscopy alone.

Even the specialist often considers bronchoscopy and esophagoscopy only as a means of dealing with foreign bodies in the trachea and the esophagus, forgetting the great role that these methods of examination should play in the diagnosis and treatment of chronic diseases of these tracts. For example, much of the modern surgery of the stomach centers about pathological conditions of the pylorus. By gastroscopy Jackson has shown that it is possible to examine the pylorus. Jackson's most valuable work, it seems to me, is the work which he has done upon the stomach and upon thymic asthma. His continued work upon these subjects should furnish results even more important than the brilliant ones which he has already obtained.

Where a book contains so much that is new it is almost impossible to review it adequately. One is tempted to quote extensively. I feel that it is better, however, to refer the reader directly to the book itself, assuring him that he will find it what he needs, and that he will get from it the inspiration which comes from studying a new subject the possibilities of which are just being recognized and developed.

HARRIS PEYTON MOSHER.

ERRA.

In May number, page 343, 22 lines from top, read "lower turbinate" instead of "middle turbinate."

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ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding
that they are contributed exclusively to THE LARYNGOSCOPE.)

VISUAL DISTURBANCES SHOWING A CAUSAL RELATION TO DISEASE IN THE SPHENOIDAL SINUSES. WITH THE REPORT OF A CASE, TOGETHER WITH CORONAL AND SAGITTAL SECTIONS DEMONSTRATING THE RELATIONS EXISTING BETWEEN THESE CAVITIES.*

BY JOHN W. MURPHY, A.M., M.D., CINCINNATI.

It is not my intention, in this paper, to go into the history of suppuration in the posterior ethmoid and sphenoid cells, as since the first report of suppuration in these sinuses in 1872,¹ to the present time the literature is prolific on this subject. This is especially the case since 1885, when Schaeffer began to call our attention to the symptoms and treatment of the disease in the living. Nor do I wish to go into an analysis of all of the symptoms which may manifest themselves in disease of the sphenoid and ethmoid cells. I simply wish to confine myself to the report of a case which I have met with recently, in which the eye symptoms were pronounced, and the causal connection seemed traceable to disease in the sphenoidal cells. This causal connection was also confirmed by necropsy. I also wish to exhibit some specimens which were made during my investigation into this subject, and which will illustrate the close relation existing between the contents of the orbital cavity and the ethmoid and sphenoid cells.

The intimate relation existing between these two cavities, and what effect disease in the one can have upon the other, must always be a question of much importance to the rhinologist and ophthalmologist.

* Candidate's Thesis. Read before the Thirteenth Annual Meeting of the American Laryngological, Rhinological and Otological Society, New York City, May 30, 31 and June 1, 1907.

That these cavities are more often the seat of disease than we suspect is constantly being forced upon us by the revelations of the post-mortem room. The suppuration is usually caused by the severer forms of acute rhinitis, while certain forms of influenza seem especially prone to attack the sphenoid cells. There seems to be no question but what sphenoidal and ethmoidal suppurations are more frequently met with now than formerly. In the European clinics of Chiari and Lichtwitz, only about 2 per cent of the cases show sphenoidal suppuration.

In the examination of 600 cases in the Massachusetts's General Hospital, Rogers,³ found these cells diseased in 5 per cent of the cases. My experience leads me to believe this higher per cent is more nearly correct for our country.

That the sphenoid is rarely diseased alone but nearly always in conjunction with one or more of the other accessory cavities of the nose seems to be the experience of all observers.

The difficulty of inspecting or even probing the normal sphenoidal opening, which is situated just above the posterior end of the middle turbinate, no doubt accounts for the low percentage of recorded cases. In a number of cut sections in my collection the anatomical relation of the posterior end of the middle turbinate, or the superior turbinate and ethmoid bulla, render the opening exceedingly difficult, if not impossible, to enter with the probe during life. The average depth of the opening is about 7.5 cm. from the anterior nasal opening, and the probe passes in at an angle of 35 degrees with a line perpendicular to the nasal opening. As you can see upon the cut section, the anterior wall of the sphenoid forms the upper edge of the choanae and by keeping this point in mind, as suggested by Gruenwald⁴, the normal opening may more readily be located by the probe.

From the close connection existing between the optic nerves and the cavernous sinuses, with the sphenoidal sinuses, separated as they are by such thin bony walls, or even by a membrane only, it seems strange that disease in these cells is not more often manifested by pronounced eye symptoms. I think we are beginning to recognize more and more that many cases of retro-bulbar neuritis of obscure cause may have their origin in a suppurating sphenoidal cell. This is especially true if the optic neuritis is unilateral in character. Since I have been investigating the subject more closely, I feel quite certain that a causal relation did exist between

several obscure cases of optic neuritis, seen in the past, and a sphenoidal suppuration, but I did not connect them at the time.

Dr. C. R. Holmes,⁵ has recorded a number of such observations, in which there could be no question of the causal connection of the eye symptoms and a suppurating sphenoidal cell.

The fact that the veins of the orbit discharge the greater part of their blood through the ophthalmic veins into the cavernous sinuses, which is only separated from the sphenoidal cells by the thinnest of bony walls, or even by a membrane only explains why an inflammation in the one can easily extend to the other and produce all of the symptoms of a retro-bulbar neuritis.

I feel that our knowledge with regard to the network of veins and lymph passages of these cavities is far from perfect, and I feel certain that the more we investigate the relation, the more often we will be able to find a causal connection between certain eye symptoms and diseased sphenoidal or ethmoidal cells.

The number of such cases reported each year is far in excess of those of the past, and I hardly think it can be due to an increased zeal in diagnosis, but rather to a failure on our part to make a diagnosis. As Gruenwald⁶, says, "Ophthalmic troubles, such as asthenopia, scotoma, painful irritation of the ophthalmic nerves, and deterioration of writing power as noted by Schaeffer, are explicable by the neighborhood of the orbital and the basal nerves. Pain is usually more violent in acute inflammation, but then it is, on account of radiation to more distant regions, still more uncertain as a diagnostic sign. The same holds good with disease of the ethmoid bone, only where the troubles are usually more severe than in any other cavity, and here, more especially, that disagreeable complication of constant pain, mental depression and intolerance to nervous excitement may be found. Asthenopia is also frequent, and the pain will be referred to the region of the eyes."

In order to get the experiences and opinions of various ophthalmologists as to the causal relation between loss of sight, or optic neuritis, due to disease in the sphenoid and ethmoidal sinuses, Prof. Onodi⁷, submitted to a number of them a series of questions on this subject. From their answers you will see that even in the large eye clinics of Europe, a causal relation is not commonly recognized.

Prof. Leber, says: "Although I have turned my attention for many years to the connection between the diseases of the posterior

sinuses of the nose, and those of the organs of sight, I have been able to note very little worthy of record with regard to the sphenoidal sinuses and the posterior ethmoidal cells."

Schmidt-Rimpler: "My experiences afford me no proof that empyema of the sphenoid cavities can of itself cause an affection of the nerves."

Prof. H. Sattler: "Unilateral optic neuritis and optic atrophy are in no way characteristic of disease of the sphenoid and ethmoid cavities."

Prof. Axenfeld: "It is my opinion that diseases of the optic nerves, (neuritis, pressure atrophy) are, if we except actual tumors and perforating cases, much rarer than we might expect in diseases of the sphenoid."

From these reports you can see that the number of recorded cases in which the eye symptoms seemed to have a causal connection with a suppurating sphenoidal sinus, and which were proven at the necropsy, are still comparatively rare.

This, no doubt, can be accounted for by the protection of the sphenoidal bone, whose upper and outer walls are much thicker than the anterior, through which the natural opening for discharge occurs.

As you can see upon the coronal section, through the frozen specimen, in which the cavernous sinus is cut through just in front of the optic chiasm, the contained vessels and nerves, going to or returning from the orbit, are protected by quite a thick bony wall from the sphenoidal sinus. Doubtless in rare cases the protection is not so complete, and it is in these cases that a causal relation may exist between a suppurating sphenoid and certain definite ocular symptoms. When extensive necrosis of the body of the sphenoid is present, then the ocular symptoms may be easily accounted for.

While my patient denied a specific history, yet the extensive destruction of bone found at the time of operation, and later at the post-mortem, was strongly suggestive of a syphilitic origin.

In this case with the eye symptoms coming on so suddenly, following the bony necrosis of the sphenoid, I think there can be no question of the causal relation existing between the two.

CASE REPORT.

Mr. E. H., age 32, came on my service at the Cincinnati Hospital, in October, 1906. He was referred by Dr. W. F. Moss, of Maine-

PLATE N^o 1

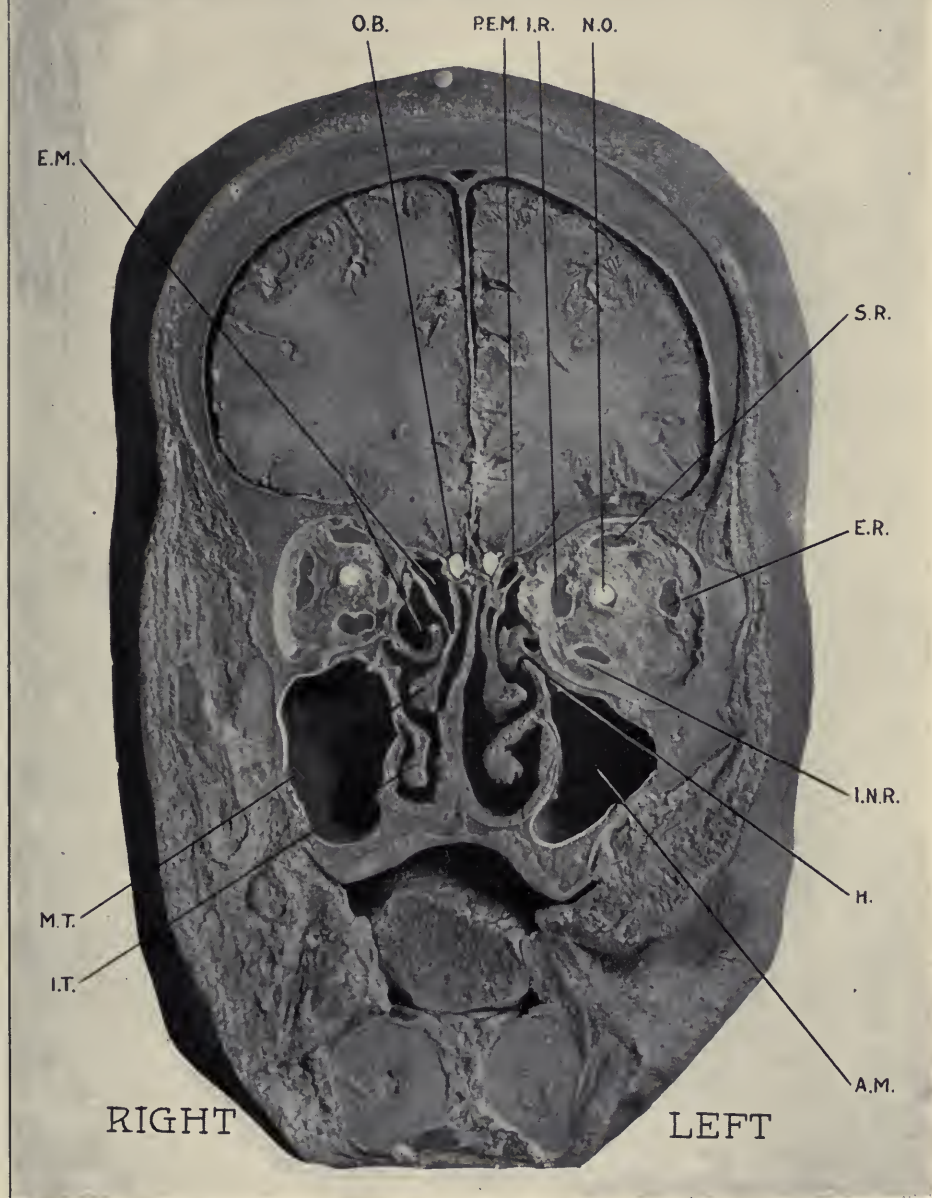


PLATE NO. 1.

Frozen Injected Coronal Section, showing the relation of the posterior ethmoid cells to the orbital and cranial cavities. I. T. Inferior Turbinate. M. T. Middle Turbinate. E. M. Ethmoid Cells. O. B. Olfactory Bulb. P. E. M. Posterior Ethmoid Cell extending over the sphenoid sinus. I. R. Internal Rectus Muscle. N. O. Optic Nerve. S. R. Superior Rectus Muscle. E. R. External Rectus Muscle. H. Hiatus Semilunaris. A. M. Antrum Maxillaris. I. N. R. Inferior Rectus Muscle.

PLATE NO. 2

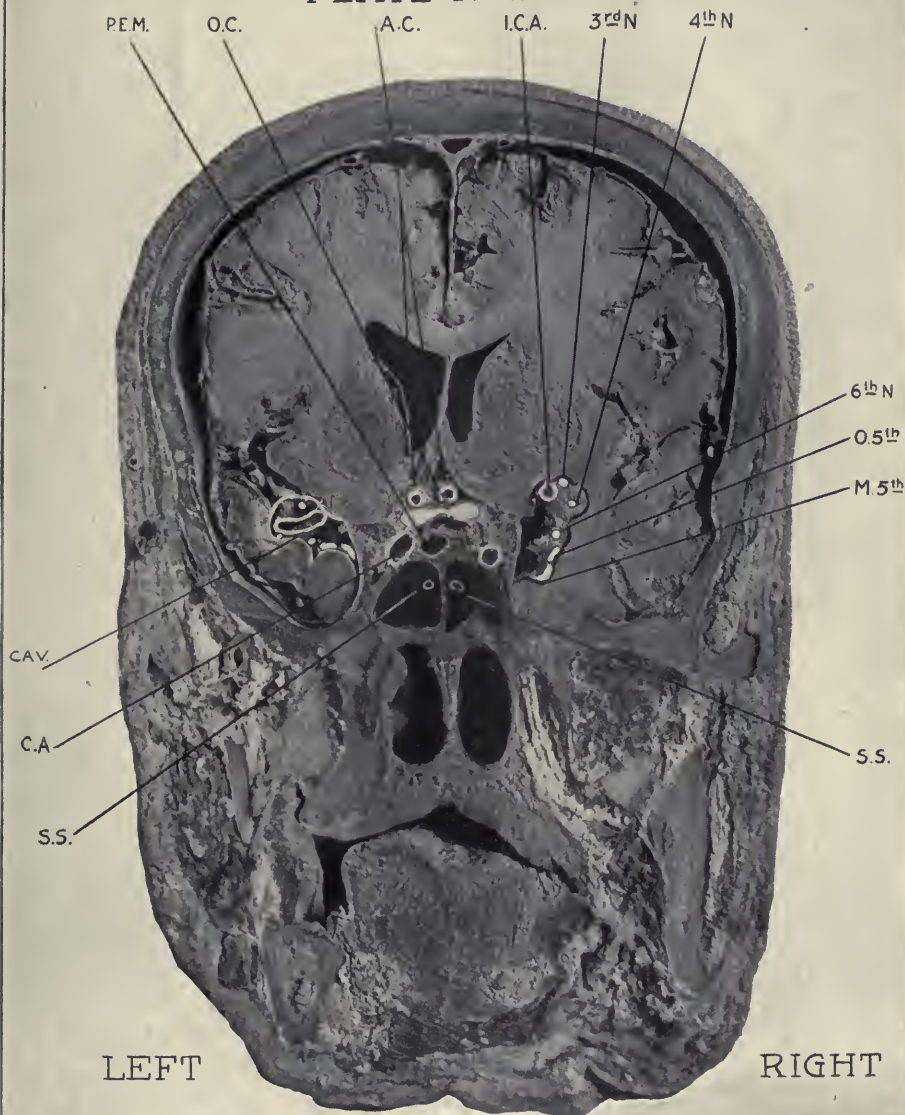


PLATE NO. 2.

Injected Frozen Coronal Section through the optic chiasm and the cavernous sinus, showing the relation of its contained vessels and nerves. S. S. Sinus Sphenoidalis, right and left, showing ostium Sphenoidalis. P. E. M. Posterior Ethmoid Cell extending back over the sinus. O. C. Optic Chiasm. C. A. Carotid Artery in Bony Canal. I. C. A. Internal Carotid Artery in Cavernous Sinus. 3rd N. Third Nerve. 4th N. Fourth Nerve. 6th N. Sixth Nerve. 5th O. Ophthalmic Division of Fifth Nerve. 5th M. Sup. Maxillary Division of the Fifth Nerve.

PLATE N^o 3

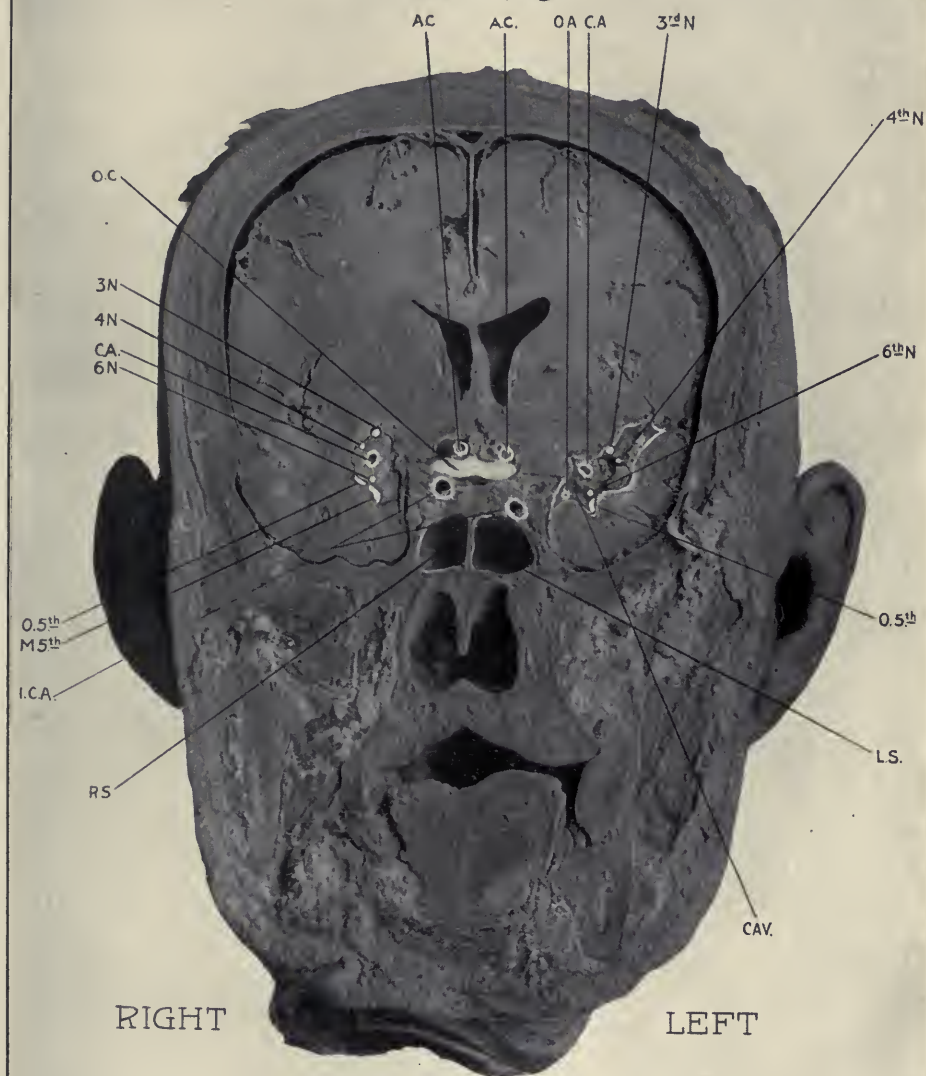


PLATE NO. 3.

Injected Frozen Coronal Section through the Cavernous sinus just back of the optic chiasm, showing the relation of the sinus to the sphenoidal cells and the position of the arteries and nerves in the cavernous sinus. C. A. V. Cavernous Sinus. C. A. Carotid Artery-Internal. 3rd N. Third Nerve. 4th N. Fourth Nerve. 6th N. Sixth Nerve. O. 5th N. Ophthalmic Division of Fifth Nerve. L. S. Left Sphenoid. R. S. Right Sphenoid. I. C. A. Internal Carotid Artery in Bony Canal of Sphenoid. M. 5th Sup. Maxillary Division of Fifth Nerve. O. C. Optic Chiasm. A. C. Anterior Cerebral Artery, right and left. O. A. Ophthalmic Artery.

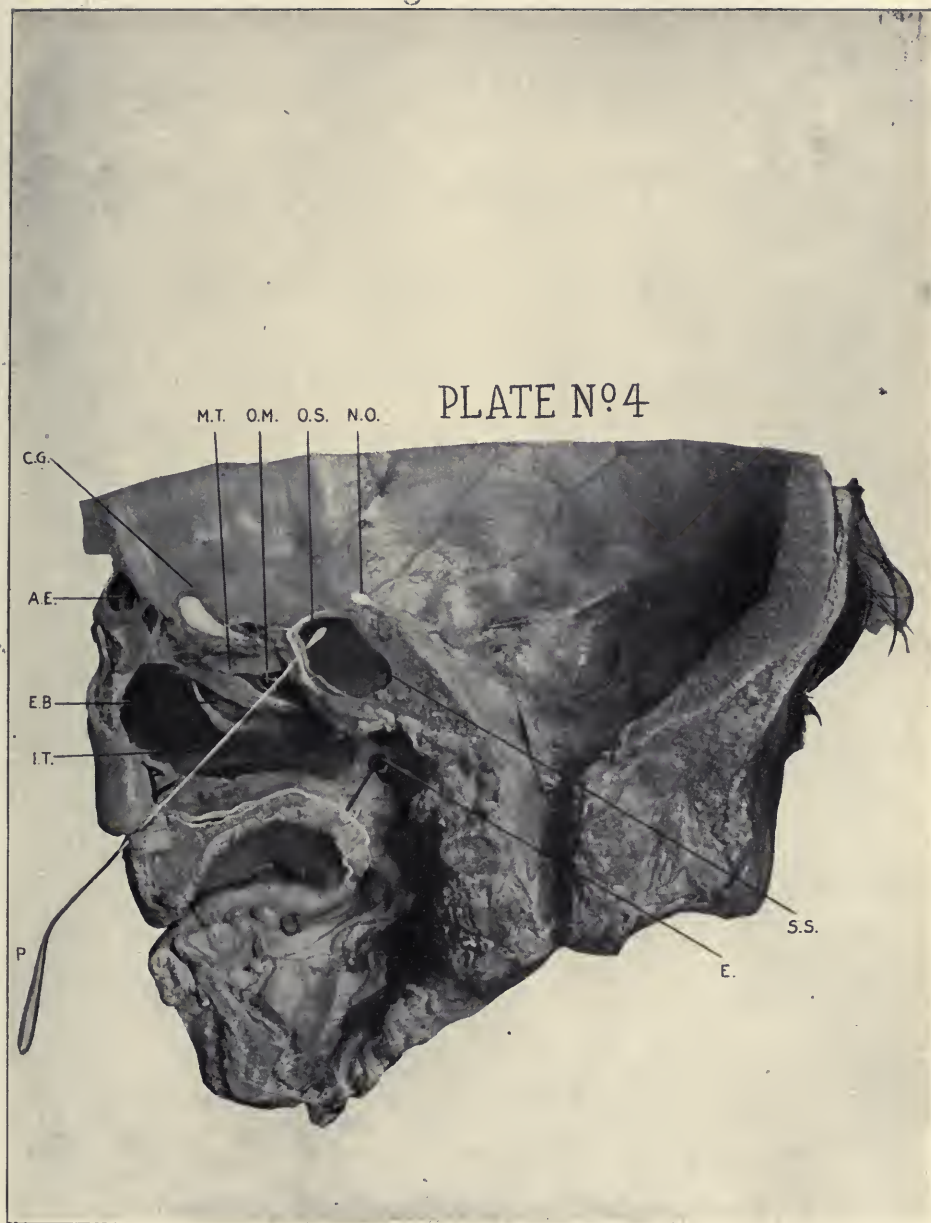


PLATE NO. 4.

Sagittal Section, showing the relation of the sphenoid with the optic nerve. Turbinated bodies atrophied. S. S. Sinus Sphenoidalis 30 m.m. long; 25 m.m. broad; 20 m. m. deep. E. Bougie in Eustachian Tube. N. O. Nervus Opticus. O. S. Ostium Sphenoidalis. O. M. Ostium Maxillaris. M. T. Middle Turbinate atrophied. A. E. Anterior Ethmoid Cell. E. B. Ethmoid Bulla. I. T. Atrophied Inferior Turbinate. P. Probe passing through Ostium Sphenoidalis.

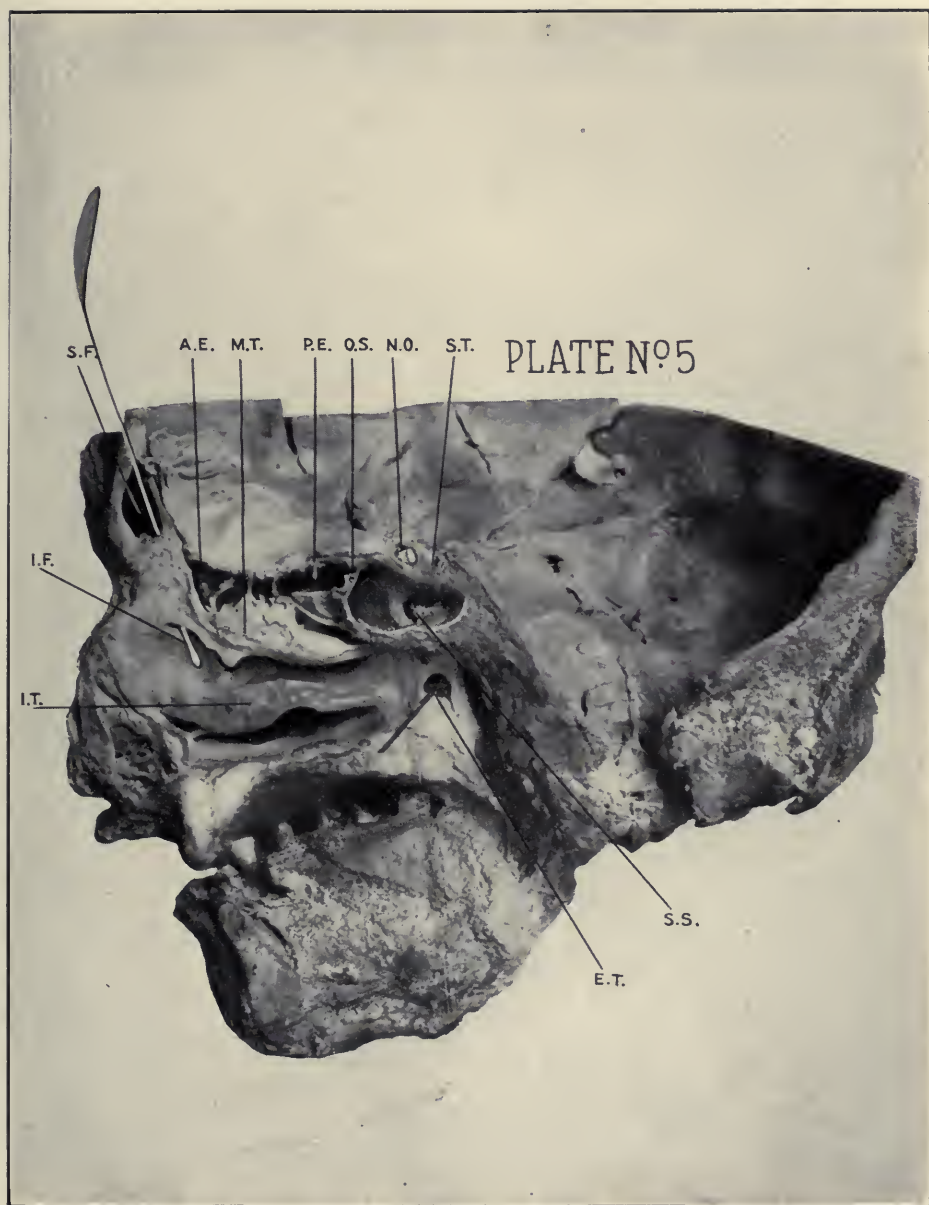


PLATE NO. 5.

Sagittal Section, showing the relation of the sphenoid with the optic nerve and the ethmoids with the frontal sinus. S. S. Sinus Sphenoidalis. E. T. Bougie in Eustachian Canal. S. T. Sella Turcica. N. O. Nervus Opticus. O. S. Ostium Sphenoidalis. P. E. Posterior Ethmoid Cells. M. T. Middle Turbinate. A. E. Anterior Ethmoid Cell. S. F. Sinus Frontalis. I. F. Infundibulum with probe passing from the Frontal Sinus. I. T. Inferior Turbinate.

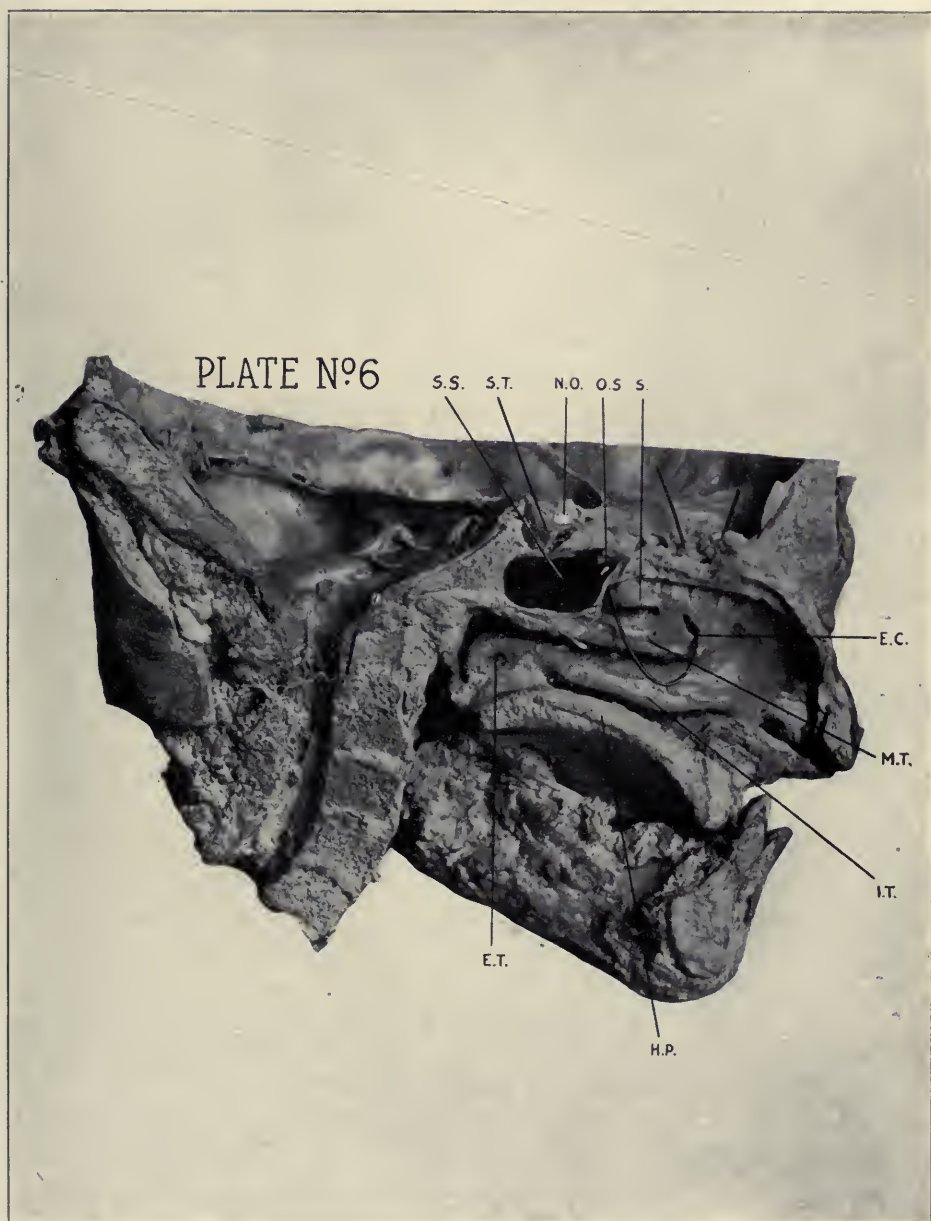


PLATE NO. 6.

Sagittal Section of the left half of the head, showing sphenoid and ethmoid cells. E. T. Eustachian Tube. H. P. Hard Palate. I. T. Inferior Turbinate. M. T. Middle Turbinate. E. C. Ethmoid Cell in Middle Turbinate, with probe passing back into sphenoidal opening. S. Superior Turbinate. O. S. Ostium Sphenoidalis. N. O. Nervus Opticus. S. T. Sella Turcica. S. S. Sphenoidal Sinus.

ville, Ohio, for an empyema of the right accessory cavities of the nose, followed by great mental deterioration, with sudden paralysis of the right external rectus muscle and blindness of the right eye. The doctor states that the patient was apparently well up to three months ago and was able to follow his calling, that of a conductor on a traction line.

Status Praesens:

The patient walks with a staggering gait, so that he has to be assisted. His mental condition is such that he can not give a clear history of his case. There is some exophthalmos of the right eye which turns toward the nasal side from complete paralysis of the external rectus muscle. The position of the eye ball is about 5 m. m. below the horizontal line of the other eye. Vision of the right eye nil. Vision of the left eye about normal. Ophthalmoscopic examination showed almost complete atrophy of the optic disc, more marked on the temporal side. The blood vessels, however, were nearly normal in size and number. This is the last expression of a retro-bulbar neuritis, doubtless secondary to an inflammation in the right posterior ethmoidal and sphenoidal cells. Examination of the left eye showed it to be normal.

Dr. D. T. Vail, saw the case in consultation and verified the ophthalmoscopic examination, and considered the condition due to suppuration in the sphenoidal sinus.

The patient complains of great pain at the occiput and at the base of the brain. There is a most offensive discharge from the right nostril, both anterior and posterior. The probe shows extensive necrosis of the posterior ethmoidal cells and the sphenoid sinus. The left side was not affected. Transillumination showed very dark area over the right maxillary antrum with absence of the pupillary reflex. The left maxillary antrum was clear and the pupillary reflex well marked. There was no difference between the reflex in the right and left frontal, both showing clear. Two X-Ray pictures were taken and both corresponded in every particular with the transillumination test.

Under chloroform anaesthesia the right frontal sinus was opened, to be sure no infection was present, since it seemed hardly possible for any sinus to escape, so extensive was the necrosis on the right side. However, the sinus appeared perfectly healthy and the wound was at once closed. The middle turbinate was removed and the necrotic ethmoid cells broken down. The maxillary antrum was entered through the canine fossa. When the antrum wall

was exposed it was found to be black from the necrotic condition present within the antrum. When the antrum was opened a most sickening odor escaped along with pus and necrosed bone. The nasal wall was removed by the Caldwell-Luc method.

The sphenoid could now be inspected and upon attempting to remove the anterior wall it was found that the whole right half of the sphenoid bone was necrosed and movable. With a finger in the pharynx, this loosened condition could be easily made out. Under the guidance of the finger in the pharynx, alligator forceps were passed in through the opening in the canine fossa, and several large pieces of necrotic bone were removed. Others could be felt but I feared to remove them lest the cavernous sinus might be injured. There was present the most extensive bone destruction I had ever encountered and lead me to believe that the disease must have existed longer than three months, as stated by the patient. It was difficult to see how a patient could exist with such an extensive necrotic condition present.

The cavity was packed with iodoform gauze through the opening in the canine fossa. The patient rallied nicely from the operation and on the following morning said he felt much better than he had for a long time, since the pain at the top of the head and back of the neck was gone. He never complained of the pain afterwards.

For several weeks following the operation his mental condition improved. The wound over the right frontal healed by first intention. Three weeks later he succeeded in tearing the wound open, by constantly picking at it, and the frontal sinus became infected. About this time also, the right ear began to discharge. On the fourth week following the operation a persisting and exhausting diarrhoea developed followed by a diffuse and severe bronchitis and the patient died, December the third, five weeks after the operation.

POST-MORTEM NOTES.

Post-mortem by Dr. Frank Hegner, Pathologist to the Cincinnati Hospital. Adult, male, markedly emaciated, phthisical chest, post-mortem rigidity absent. Above internal angular process of the right eye there is a small wound of a previous operation. Foul odor about the head.

Brain—On removing the calvarium and opening the right frontal sinus, a sero-purulent exudate was found in the latter cavity. This

same inflammatory condition was found in the tissues of the orbital fossa, and with increasing severity to complete necrosis in the right anterior and posterior ethmoidal cells, also the right sphenoidal sinus, and the left posterior ethmoidal sinus. To a less degree in the left anterior ethmoidal cells. The process caused necrosis of the floor of the orbit, and extended directly into the antrum, the posterior and lateral walls of which were completely necrosed. Nothing remained of the sphenoidal sinus excepting debris.

Communication between the right middle cerebral fossa and the pharynx was direct. The right middle and internal ear showed sero-purulent inflammatory changes.

Membranes—Dura in the right middle fossa was markedly thickened and very firmly adherent to the sphenoidal fissure and adjacent bone. Over the body of the right sphenoidal bone this thickened dura formed the only barrier between the brain and the necrotic sphenoidal sinus.

Pia and arachnoid showed over the right hemisphere, anteriorly and inferiorly, marked lepto-meningitis. On section no macroscopic lesion was found in either hemisphere.

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4 W. 7th St.

RADIOGRAPHY AND TRANSILLUMINATION IN DIAGNOSIS OF SINUS DISEASE.*

BY JOSEPH C. BECK, MD., CHICAGO.

The value of radiography for diagnostic purposes is so well established at the present time, especially in connection with general surgery, that I feel it is not necessary to take up its origin and progress. However, so far as its application in our specialty is concerned, I must admit that it is very much neglected. The cause, I believe, is the fact that the results thus far obtained were very unsatisfactory. The blame for this can be laid to the radiologists, most of whom are not familiar with the anatomical structures of the sinuses (Grashey's Atlas),¹ nor their pathological lesions. Consequently, the results obtained are unsatisfactory in most instances, and there is great lack of enthusiasm on the part of the radiologist as well as the rhinologist. I am convinced that if a radiologist were to make himself acquainted with the above said conditions, namely, anatomy and pathology of the sinuses, he would obtain just as good results in this line as he does from skiagraphs of stones in the kidney, diseased lungs, etc., and would aid us a great deal in the diagnosis and treatment. Under the present conditions, I believe the best remedy is that the rhinologist assist the radiologist in obtaining the best results. The former is to outline the disease, and the latter does the mechanical part of taking the radiograph and developing it; finally, both study the plate and come to conclusions. That has been my method of procedure.

Albers Schoenberg² is one of the few radiologists abroad who has devoted considerable time in developing the radiology of the head, but in this country the credit belongs to Caldwell, who, with the association and co-operation of Coakley, has given us a valuable method of obtaining good plates of the sinuses. The only regret I have is that the method was known to them and not published for such a long time, although presented to a society of radiologists for a year past, that much valuable information could have accumulated by this time on the radiography of the sinuses. I have been and am familiar with a number of rhinologists who also have spent a great deal of time and money on radiographs of the sinuses, only to be disappointed by their results. This I say was

* Read before the Eleventh Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology, Louisville, Ky., September 26-28, 1907.

all due to imperfect technique in not knowing exactly at what angle the rays should traverse the head in order to get a distinct image of the sinuses as to size and pathological condition.

Scheier,⁴ in 1897 and 1898, was the first man who proved pus in an antrum by X-ray plate in that he washed out the pus, filled the cavity with water, and showed an entirely different density in the second plate.

Winkler and Brautleicht⁴ made a number of observations on X-ray plates taken of skulls devoid of soft parts, but most of their work was done in the transverse view. It was done with especial reference to Winkler's osteoplastic operation on the frontal and ethmoidal sinuses. Mosher⁵ has made a number of observations on X-Ray plates, and deduced from them certain measurements of the sinuses. Coakley,⁶ in 1905, was about the first to describe and give his results with the use of the X-ray in diagnosis of sinus disease in this country, but so meagre was his report as to the technique that not much knowledge could be obtained from his description. His radiologist, Dr. Caldwell,⁷ who, I believe, does the most superior work in this or any other country, read a paper on skiagraphy of the sinuses, but his article did not appear until nearly a year later. Killian and Goodman⁸ published their series of experiments on the skiagraphy of sinus diseases only last April, although their work precedes that of Coakley, the latter following their methods. Killian's results are very satisfactory, and the 38 cases that he reports were practically in the pathological condition and anatomical formation which the skiagraphs indicated. Their method in the technique is practically the same that I use and will describe presently. The most recent work published by a rhinologist on the use of the X-ray for sinus diseases is that by Wassermanns,⁹ and since his technique, results and conclusions are practically the same as mine, I, therefore, will not go into the details of his article, but present my personal experience and observation, which date back about three years. If I go into greater detail in the technique than necessary for the average radiologist, I hope to be pardoned, as I am speaking principally to rhinologists.

TECHNIQUE.

a. *Equipment*—1. Coil and cord. 2. Table. 3. Compression apparatus. 4. One medium tube. 5. High tube. 6. Plates. 8x10. 7. Developing room with equipment. 8. Transillumination box.

In case stereoscopic views are taken, one needs an apparatus for the examination of such plates, which is a large stereoscope.

b. *Method of Procedure.*—In taking a picture of the sinuses in the antero-posterior direction, the patient is placed on the table face down on to a plate, 8 by 10, in such a manner that the whole top of the head will be reproduced, also the lower margin to include the upper teeth. In that way all the anterior group of cells, frontal ethmoid and antra, on both sides, will be represented. The second step is to adjust the compression apparatus in such a way that when the tube is put in the proper place over the compression apparatus, the rays from the target, which is at a distance of eighteen inches, will pass above the occiput and not through or below it, as was formerly done by many. This is the essential point in the technique that I wish to bring out, for it avoids the dense part of the occipital bone and base of the skull, also in a measure excludes the large sphenoidal sinuses that are liable to mask the other anterior groups of cells, as already mentioned by Coakley in one of his cases.

Caldwell describes a specific method in obtaining the proper angle by taking the base line, which represents the base of the skull, from the external auditory meatus to the glabella, and a line drawn at an angle of twenty-five degrees to this latter line gives the proper angle. The third step is to call attention to the patient, not to start when the current is turned on, but to remain perfectly quiet, although he cannot move his head anyway. It has been the practice of our radiologists to show the patient what the X-rays are, and this has always a quieting effect on neurotic individuals. The current is turned on, 110 volts, 12 amperes, and timed. The length of time we have varied according to the thickness of the skull and the kind of tube we use, whether high, medium or low. As a general rule, with a medium tube, we expose the patient from 60 to 80 seconds, and with a high tube from 30 to 40 seconds, in ordinary thickness of the skull, but in very massive skulls as long as two and a half minutes. The fourth step is to remove the compression apparatus, relieve the patient, take charge of the plate for developing. I might say that for the protection of the plate from perspiration, it is a good idea to place between the plate and the patient an extra layer of waxed paper, else the plates already wrapped in the double envelope may be spoiled.

Fifth, developing the plate. We use Ortol solution, about twenty minutes. The under-development of the plate is a very serious mistake in the technique. Permit to dry thoroughly, from six to eight hours.

Sixth. the examination of the plates, preferably in a darkened room, by means of a transilluminating box. With the aid of the radiologist, we study the outline and changes in the degree of cloudiness or density compared to the normal condition. This is the most interesting part to me, and to compare the results to other methods of examination. as transillumination and intranasal inspection.

In taking a skiagraph of a profile, that is, a transverse view, the steps are as follows: First, patient on the side, depending on which side you wish to bring out most clearly. For instance, with a right-sided frontal, ethmoidal and antral or sphenoidal disease, we put our patient on the right side, as the plate will show most clearly the structures nearest to it. Observe the same rule as to the head covering the entire plate. Second step: Compression apparatus. Place so that the rays from the target pass through the base of the skull. This view will also represent a lateral view of the mastoid and middle ear. Third step: Turn on the current and expose again, depending on the thickness of the skull and the degree of the tube.

requires a shorter exposure for transverse views, usually from 40 to 60 seconds, with a medium tube. The fourth, fifth and sixth steps are the same as in the antero-posterior exposure.

If one wishes to obtain plates of the antra alone, one can take each side separately for stereoscopic views.

DEMONSTRATION OF NORMAL AND PATHOLOGICAL PLATES OF THE SINUSES.

Plate 1. Shows a skiagraph of a skull taken in the antero-posterior direction. It demonstrates the parts very clearly, owing to the absence of the soft parts. The contrast shows all dense substances white, and spaces dark. The degree of white or black is significant in diagnosis of disease, or absence of the same. The anatomical landmarks are: (1) The orbita, with the superior and inferior margins. (2) The nasal spine, and the lateral wall of the nose, as well as the floor, indicating the nasal fossa, divided by the septum. (3) Malar bones. (4) Superior maxilla, its alveolar processes and teeth. (5) The rami of the lower jaw. The details are: First, the frontal sinuses, with the various subdivisions or septa¹⁰, on the left side, and very interesting fact in this skull, discovered only after the plate was taken, i. e., the absence of the right frontal sinus, only showing the small diploic space, not communicating with the nose in the right side. Second, the ethmoidal cell, with the lacrimal canal in front of it. Third, the antrum of Highmore, in which are seen many white streaks, representing the dense part of bone

of the skull, as the pterygoid plates, etc., but a distinct outline of the wall of this sinus is very clearly shown. You can also observe some other anatomical points not seen when the soft parts are present. (a) Sphenoidal fissure in the orbita; (b) infraorbital foramen; (c) lines indicating the course of the blood channel; (d) sphenomaxillary fossa; (e) the two brass springs are shown most clearly; (f) the black line indicating the horizontal cut of the calvarium usually found in the preparation of a skull.

Plate 2. Same skull taken in the transverse meridian. With the right side next to the plate. It shows the same structures from the side, but not so clearly, however, inasmuch as they are superimposed one on the other. **In addition, one can make out the sphenoidal and posterior ethmoidal sinuses, and depths of the antrum.**

You will observe the absence of the frontal sinus, which is on the right side. There is no frontal sinus on that side in this skull. Again, you observe the dense base of the skull, with the temporal bone. **Here the mastoid process with the middle ear cavity is clearly demonstrated.**

Plate 3. A normal head, taken in an antero-posterior direction. This man has never had any nasal obstruction, not even a corvza. He has, in fact, never been ill, and is a perfectly developed man, and has as nearly normal nose, throat and ears as one can find. You observe the same anatomical conditions as in the skull, except not so clearly defined, on account of the soft parts. It, however, represents more nearly the appearance of the structures in the study of disease. You observe the uniformity of the shadow of the cavity. The most important point in diagnosing obstruction or pathological changes of the sinuses from normal or thickening of the bone.

Plate 4. Same head, taken in a transverse direction. Same conditions prevail as in Plate 2, of the skull, except the frontal sinus is clearly demonstrated. It shows its antero-posterior diameter as well as its height, but you can see the superimposition of the two frontal sinuses.

Plate 5. A case of double subacute sinusitis involving all the sinuses, following an influenza. All the usual clinical phenomena are present, as pus from the various regions of the sinuses, tenderness on pressure, and the subjective symptoms, as morning periodical headaches and marked mental depression. Transillumination is very unsatisfactory in this case, as both sides are involved. However, the light reflex can be made out in the papillary area. The patient cannot bear the pressure over the frontal sinuses caused by

the transillumination apparatus. The essential point in this plate is the cloudiness of all the anterior group of cells. The patient has been under treatment only three weeks; local irrigation in the region of the ostia with normal salt solution has been used, and he is improving very rapidly. The showing of the plate after recovery is necessary to complete a complementary picture of this plate, and will follow before publication of this paper.

Plate 6. Double chronic frontal sinusitis of right ethmoidal, antral and sphenoidal sinuses, and all the clinical phenomena, as severe headache, especially over the left side, are present. There is pus from the regions of the ostia, and transillumination is positive. Patient has been treated for some time locally by intranasal operations, such as middle turbinectomy and ethmoidal curettement, with but partial relief. Waiting over six months, and following the taking of this plate, we decided to do an external operation. I performed Winkler's osteoplastic operation on the right frontal and ethmoidal sinuses, breaking through the septum into the left frontal sinus, and communicating it with the right side. The Caldwell-Luc antrum operation was performed at a subsequent time, using the Vail¹⁴ saw to make the operation into the lateral wall of the nose. We found during the operation the anatomical and pathological condition exactly as indicated in the plate. Pathologically, the sinus contained some muco-pus and much degenerated muco-periosteum. At another subsequent time I removed the anterior wall of the sphenoidal sinus. For the past six weeks the patient has been well.

Plate 7. Double frontal and ethmoidal sinusitis of a chronic type, with multiple nasal polypi on both sides. No pus. Very severe frontal headache. Intranasal operation of removal of the polypi and middle turbinectomy, curettement of the ethmoid region, breaking down of the anterior wall of the sphenoid, was followed with but partial relief of the severe headaches. Six months later, I performed the Halle procedure¹² into the frontal sinus. This is a very difficult operation and was followed by marked reaction, as a temperature of 104°, very rapid pulse, and it took three weeks before these symptoms subsided and the patient recovered. But at the present time he is very well, and the nose appears to be in good condition.

Plate 8. Multiple nasal polypi, causing complete nasal obstruction for several years. Has asthma and chronic bronchitis; marked headache over the frontal and occipital region constantly. Removed

all the polypi and middle turbinated bodies. Ethmoidal curettement. Opening of the sphenoid. Relief from the asthma and headache for a period of a few months; then the headaches recurring, in fact, increasing, so that an external operation was advised, but refused. You observe a cloudy appearance of these sinuses, that is, the ethmoid and frontal, which shows that the cure is but partial.

Plate 9. Bilateral frontal sinusitis chronica. This man has been suffering from frontal headache for the past two years, almost incessantly, and uncontrollable by any method of treatment. Transillumination negative. Nasal examination: Marked deviated septum and thickening of the middle portion of the same. Sinuses show cloudy. There is no pus discharge. I did a submucous operation, as preliminary to the middle turbinectomy work. Patient very much improved since that operation. A radiograph six months later will be of inestimable value if during all that time he remains free from his headache, which then ought to show clear sinuses.

Plate 10. Pansinusitis chronica, following a severe influenza complicated by acute pansinusitis. The symptoms are extreme dullness of intellect and pain in the head constantly, especially over the frontal region. Pus exuded from region of the sinuses; transillumination dull; antrum and frontal. This skiagraph shows the cloudiness of all the cavities. The usual intranasal treatment was of no avail. Intranasal surgery, as a middle turbinectomy and curettement, breaking-down of the anterior sphenoidal wall, was followed by some relief. Three months later an external operation was advised and performed, and an osteoplastic on the frontal and ethmoidal sinuses. I used in this case Halle drills from above downward, also making a large opening into both antra by means of the Halle angular drills. These procedures were followed by absolute cure. The nose is in as normal condition as one may expect after such procedures. At the time of the operation we found the condition of the sinuses corresponded exactly to the outline in the plate.

Plate 11. Pansinusitis chronica. Having lasted four years, without any relief from treatment or intranasal operations. He has had several attacks of acute frontal sinusitis, with marked pain and some swelling externally, which, however, always subsided in a few days. Transillumination positive of the antrum, but very unsatisfactory of the frontal. External operation; Winkler's osteoplastic, etc., as in case reported in *Plate 10*. Recovery.

Plate 12. Chronic pansinusitis. Local treatment did not cure suppuration. Decided to operate externally. Before so doing, we

took this plate, and it showed that there were no frontal sinuses present, except two small dilatations at the root of the nose. But it does show a very cloudy ethmoid and antrum on each side. Punctures of the antra followed by washing were always associated with pus. We therefore did an intranasal operation, as moderately enlarging the trocar punctures, with the antrum punch, curettage of the ethmoids; also enlargement of the sphenoidal sinus openings. These procedures were followed with good success. The interesting points in this plate are the absence of the frontal sinuses in both views, and it demonstrates the value of this method of diagnosis, for any procedure, whether intranasally or externally on the frontal sinus would have very likely led to serious results.*

DEDUCTIONS IN GENERAL.

1. That the real value of a skiagraph for diagnosis of sinus disease is in taking an antero-posterior exposure, as shown in Plate 1.

2. That the skiagraphs taken in the transverse view are of but very little value for diagnostic purposes, owing to the fact that one side is superimposed upon the other, but it will give an outline of the sphenoidal as well as the anterior group of cells as to their shape and size.

3. That the angle at which the tube is placed is of the greatest value, taking particular care that the rays do not have to penetrate through the massive part of the base of the skull. A transverse line seen across the orbit is found if the angle at which the plate was taken is correct, and this line is found about a half an inch below the supraorbital margin.

4. Dangerous conditions, as burn, alopecia, are possible only if one has no knowledge of the technique, or from carelessness. However, do not expose your patient to repeated long exposures within a brief period of time. I have never had a bad result from the use of the X-rays.

TRANSILLUMINATION.

The value of transillumination of the sinuses must be limited to the frontal and antra, as the ethmoid transillumination is not at all practicable. Although, as said before, skiagraphy will not prove much in posterior ethmoid and sphenoidal disease, it will, however,

* Owing to the unsatisfactory reproduction of the plates for publication, the author decided not to use them, rather than to retouch them for such purpose.

do so in an anterior ethmoidal sinusitis. Transillumination of the frontal sinuses is of very little value, although recently Vohsen¹⁵, the author of this method, defends it in preference to the X-rays, because he says the latter is not practical, and within the reach of very few specialists, as is his little lamp. He lays particular stress on pressing firmly the rubber protection tip of the lamp against the infraorbital margin, and an absolutely dark room. It is quite different in regard to the maxillary antrum. Here the results are fairly satisfactory. The point in the technique of transillumination of the max-



Transillumination Hood.

illary sinus is to have thorough closure of the lips when the lamp is in the mouth. The difficulties are that there is no standard light established. Abroad, the small lamps are used, and in this country the large ones. I am partial to the latter, as my results are more satisfactory with the larger lamps than they were formerly with the small Vienna style.

Another difficulty is in obtaining an entirely dark room. Either it is a stuffy little closet or it requires considerable time to get your office so darkened as to make the procedure practicable. I have, therefore, adopted for the past four years this method of placing this hood over the patient, which is connected with this tube; at its end is the opening which fits very firmly about the eyes, and be-

ing held by this handle with my left hand. With the right is held the transilluminating apparatus, and passed through a slit from below which fits firmly about the wrist. Thus the openings about the examiners eyes and about the patient's head are absolutely light-proof. I have used this method, as said before, for about four years, and am satisfied with it.

N. B. Another plate of No. 5 has been taken since patient recovered (7 weeks later), but the sinuses do not show very much clearer, except that the marginal outlines are sharply defined.

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1220 N. Clarke Street.

THE PREMAXILLARY WINGS AND DEVIATIONS OF THE SEPTUM.*

BY HARRIS PEYTON MOSHER, M.D., BOSTON.

There are two great causes of deviations of the septum, trauma and asymmetry of growth. Of late trauma has been held to play but a minor part. The tendency has been to make unequal development of the halves of the head the chief cause. Undoubtedly this is true in certain cases but more often the inequality of growth is confined to the bones which make the hard palate, namely, the superior maxillae, the palate bones and the premaxillae. I wish to show that irregular and delayed eruption of the teeth, especially of the incisor teeth, is the cause of this asymmetry in a large number of cases. Further, I wish to reinstate trauma as a prominent cause of deviations of the septum.

My attention was called to this subject by a paragraph in *Sieur and Jacob's Anatomy of the Nasal Fossae*. In the chapter on the septum, in the summary of the causes of deviations, the following statements are found; (page 42); "Hypertrophy of one of the elements making the premaxillary group of bones (the subvomer bone and the nasal spine) appears to play a great part in the formation of crests and spurs which are placed at the entrance to the nasal fossae just behind the nasal spine and appear to be incorporated with the floor. * * * Potiquet has shown that for the subvomer bone in particular the hypertrophy is connected with the eruption of the incisor teeth which are lodged in the premaxillary bones. It seems that this group of bones, originally independent of the superior maxillary bones, undergo to a less extent than these the retrograde changes which all anthropologists have pointed out in the superior races. There can be therefore, not only a failure of parallel growth between the skull and the face but also between the different elements of the face. From this it follows that the projections and ridges of the septum anteriorly which are due to hypertrophy of the subvomer bone or the nasal spine are caused in the last analysis by the same underlying path-

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The illustrations were drawn by the writer. From the Anatomical Laboratory of the Harvard Medical School.

ological cause as ridges or spurs which are placed posteriorly, namely—they are due to some disturbance in the development of the face.”

I am convinced that this is true. Hypertrophy or displacement of the subvomer bone, however, can do more than cause ridges and spurs just back of the nasal spine. If there is marked delay in the eruption of the incisor teeth not only are the premaxillary wings (I prefer to call the subvomer bones by this name) thrown out of line but the cartilage of the septum is thrown out of its bed in the vomer for a very considerable distance and the septum is deviated in consequence. The starting point of a great many deviations is anterior. The force which causes them is applied anteriorly but is felt not alone anteriorly but posteriorly. At the present time I am not prepared to say just how many deviations of the septum are caused in this way, but since I have been looking into the question I have been surprised to find that so many could be assigned to this cause and I feel that continued clinical work will make the percentage of deviations so caused a high one.

Dentists for a long time have been aware of the connection between crowded teeth and deformities of the septum but as far as I have seen, in a very superficial examination of the literature, the exact relationship between the teeth and the septum has not been brought out. My work has been clinical and anatomical, an endeavor to satisfy myself as to some of the details of this relationship with but little reference to the literature except for the basal idea of the investigation, which as I said is found in Sieur and Jacob and is due to Potiquet.

In discussing my subject, the enlargement and displacement of the premaxillary wings as a cause of spurs and deviations of the septum, I shall do so under the following headings; First, a review of the development and the anatomy of the septum; second, the changes which occur in the premaxillae as the incisor teeth erupt; third, the condition of the septum in forty cases of delayed and irregular dentition; fourth, a description of the examples of deviation of the septum found in the dissection room, where the deviations were due to hypertrophy and displacement of the premaxillary wings; fifth, asymmetry of one-half of the palate as a cause of deviations; and finally, trauma as a cause of deviations.

The Nasal Processes. The nasal process at a very early stage in the embryo is seen to be divided into two lateral processes and two

mesial processes, the latter having globular enlargements as tips. These processes are vertical septa springing from the base of the primitive capsule of the fore-brain and the parts seen on the face are the anterior ends of these septa. (Plates 1 and 2.) The mesial nasal processes fuse together and form the whole septum of the nose, the premaxillae and the middle third of the upper lip. They form also the mesial limbs of the alar cartilages.

The Vomer. The vomer is developed from the perichondrium which covers the primitive septal cartilage. A center of ossification appears in the third month at each side of the cartilages posteriorly. These fuse together below. Thus the vomer is at first

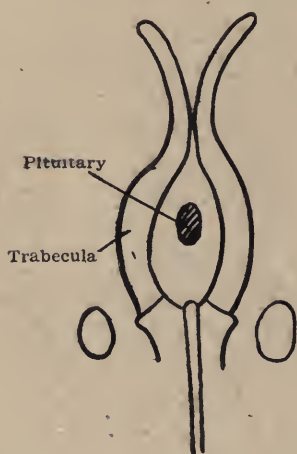


Fig. 1.

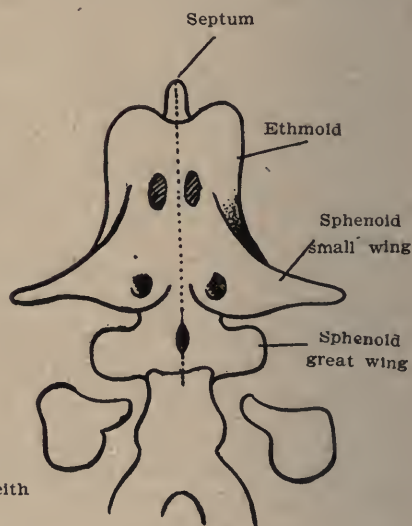


Fig. 2.

After Keith

PLATE 1.

Figure 1. Diagram of the trabeculae cranii.

Figure 2. The trabeculae have widened and developed into the sphenoid and the ethmoid and septum.

a trough into which the cartilage of the septum is implanted.

The Vertical Plate of the Ethmoid. The vertical plate of the ethmoid is formed by a direct ossification of the primitive cartilage of the septum. Ossification begins in the fourth month of foetal life. The crista galli, the intra-cranial part of the septum, is formed in part by ossification proceeding from the attachment of the falx cerebri.

The Premaxillae. The two premaxillary bones form the sockets for the upper incisor teeth. In the human foetus at birth the suture between the maxilla and the premaxilla can be seen on the hard

palate. (Plate 3.) It runs diagonally forward and outward from the anterior palatine canal to the alveolus between the lateral incisor and the canine tooth. On the facial aspect the premaxillae fuse with the superior maxillae in the third month of foetal life, the maxillae overlapping and almost completely excluding them from the face. In mammals generally the premaxillae are highly developed and form the snout. In the higher primates the face becomes less elongated and the premaxillae less developed. In the orang, for instance, the premaxillae are distinctly seen on the face at birth

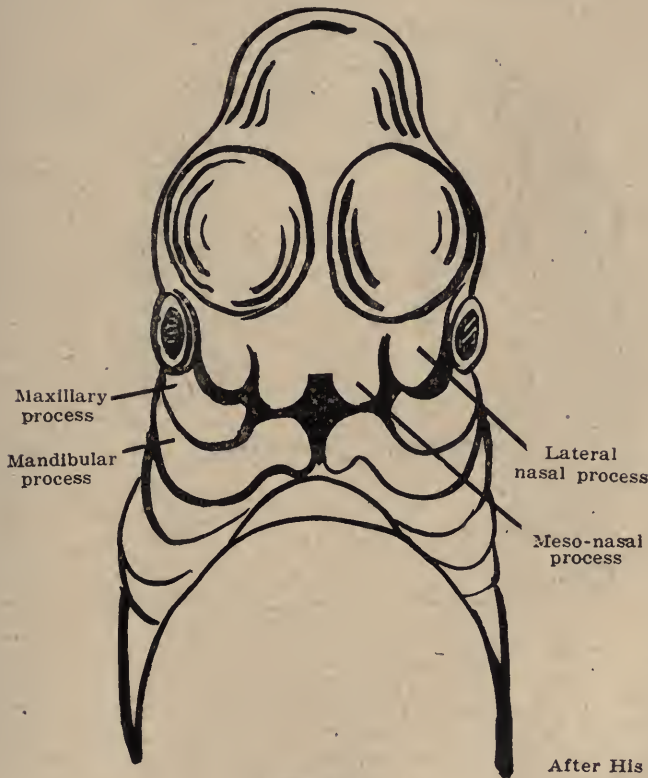


PLATE 2.

After His

Embryo of fourth week showing formation of the face by the nasal, maxillary and mandibular processes.

but as the permanent canines begin to be developed they fuse with the maxillae.

In man each premaxillae is usually ossified from two centers placed side by side. The two premaxillae unite in the first year after birth. Their vestigial character in man is due to the small size of his masticatory apparatus and the consequent retrogression in the development of the facial part of his skull. (Keith, pp. 3-5.)

The result of all this is that the septum becomes ossified from behind forward. Not the whole of it, however, for the anterior part remains as cartilage. This is known as the quadrangular cartilage. I wish to lay especial stress upon two points in the development of the septum. The paired origin of all parts of the septum; and the fact that developmentally the premaxillae are as much parts of the septum as the vomer.

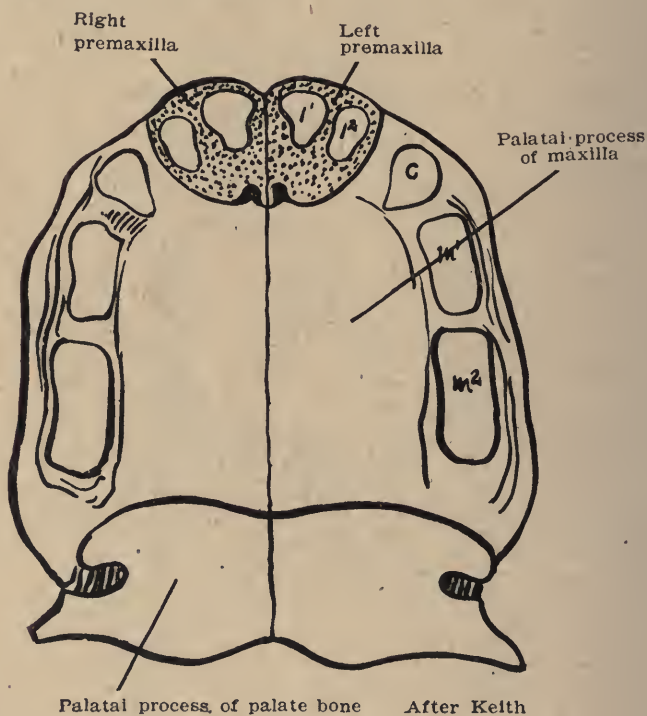


PLATE 3.

The hard palate at birth. The phemaxillary part is formed from the mesial nasal processes. The remainder by the palatal processes of the superior maxilla and of the palate bone.

The Septum at Birth. The septum at birth is almost all cartilage. (Plate 4.) The only bony parts are the vomer and the two premaxillae and their processes. The vomer has a very characteristic form. It consists of two leaves of thin bone united below and open and flaring above. (Plate 5.) This formation is a relic of its double origin, evidences of which the vomer never entirely loses. The premaxillary wings make the vomer over again in miniature. Therefore, they also form a V, or gutter. The premaxillary wings spring from the posterior half of the upper surface of the premaxil-

lae. In the groove which they form rests the tip of the vomer. Two other processes spring from the superior surface of the premaxillae, one from each, namely the nasal spines. These again make a slight gutter, into which in its turn fits the tip of the premaxillary wings. The tip of the vomer rests in the gutter of the

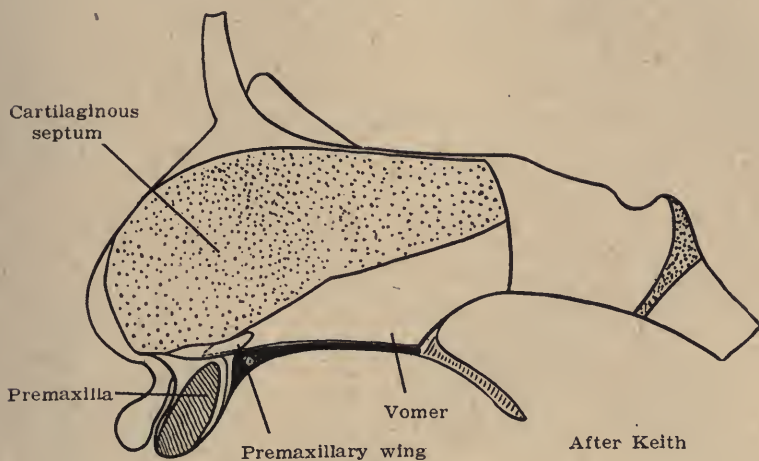


PLATE 4.
The septum at birth.



PLATE 5.

The vomer at birth, showing the two leaves and the gutter made by them. premaxillary wings, and the tip of the premaxillary wings rests in the gutter of nasal spines, like the sections of the old fashioned V-shaped wooden drain. (Plate 6.)

The Adult Septum. The upper border of the adult vomer is gutter shaped like the vomer at birth, the gutter not being so

deep. (Plate 7.) It is surprising how long the vomer retains this characteristic to a very marked degree. At four years of age the vomer still consists of two leaves for half its width. In the adult septum the lower border of the perpendicular plate of the ethmoid is gutter shaped the same as the upper border of the vomer, with which it articulates. Between these two bones, therefore, there is a lozenge like space filled with cartilage. The strip of cartilage which fills this space is an offshoot from the posterior inferior angle of the quadrangular cartilage. It runs backward and upward in the space thus left for it, at times reaching the front wall of the sphenoid. This prolongation is called the caudal prolongation. The following

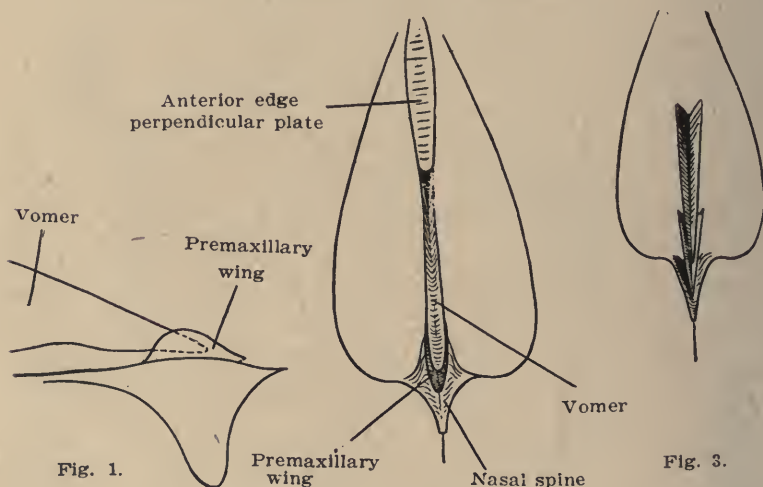


PLATE 6.

Fig. 3. is a diagrammatic drawing showing how the vomer lies in the premaxillary wings, and the premaxillary wings lie in the gutter of the nasal spine.

are the other peculiarities of the adult septum which have a bearing upon the subject of this paper. The lower part of the quadrangular cartilage just above the premaxillary wings is very thin, whereas the upper part of this same cartilage in line with the middle turbinate is thickened into what is called the tubercle. After eight years of age the further growth of the quadrangular cartilage occurs chiefly at a center of growth just above the premaxillary wings. There is a second less important center of growth half way up its posterior border. At birth neither the palate bones nor the superior maxillae rise into a crest for the support of the lower edge of the septum. (See Plate 4.) In the adult on the other hand both

these bones have marked crests. These grow upwards while the rest of the septum is growing downward affording at times, another factor in disturbing the equilibrium of the mosaic of the septum. This factor is not generally considered.

It has usually been held that the weakest part of the septum is the articulation between the upper border of the vomer and the lower edge of the perpendicular plate of the ethmoid. From the description of the septum which has just been given it is easy

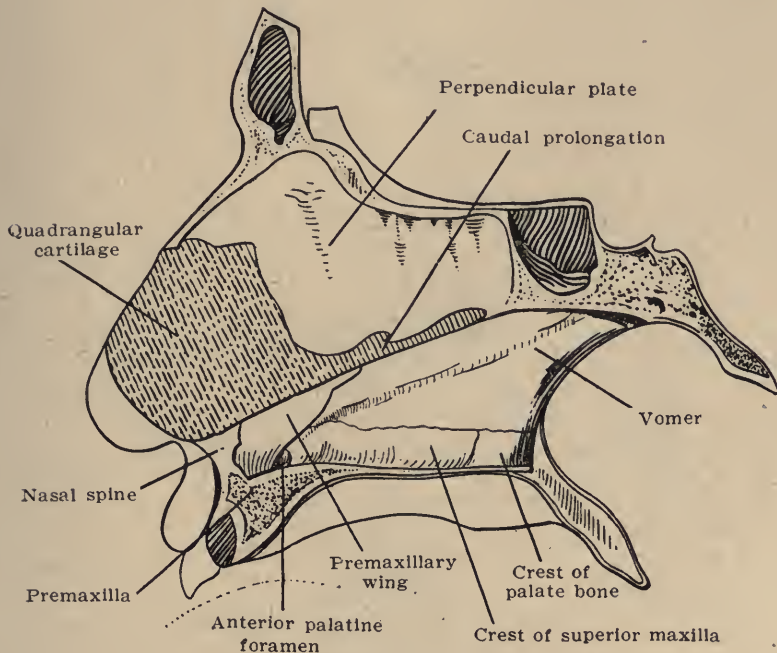


PLATE 7.

The adult septum.

to see why this is so. There is, however, another part of the septum which is as weak or weaker than this suture line. This place is at the tip of the vomer, or the region of the premaxillary wings. Here the mosaic of the septum is the smallest, here the tip of the vomer lies in the groove of the premaxillary wings, here the caudal prolongation of the quadrangular cartilage starts, here the quadrangular cartilage is the thinnest, here is placed the remnant of the organ of Jacobson, and here the quadrangular cartilage has its chief center of growth. Anatomically, therefore, this part of the septum is especially fitted to be the starting point of spurs and

deviations. If for any reason the equilibrium of the septum is upset one would expect it to show itself first at this point.

The two premaxillae do not fuse until well into the first year. When they are disarticulated each premaxilla is seen to be an oval shell of bone, all the faces of which are very thin. The body of the bone is completely filled with the crowns of the incisor teeth and accurately takes its form from them. (Plate 8.) Projecting

Fig. 1. Side view.

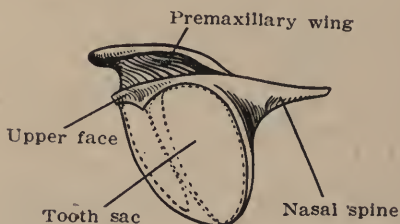


Fig. 2. Front view.

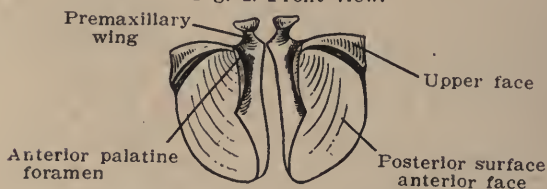


Fig 3. Premaxilla seen from above.

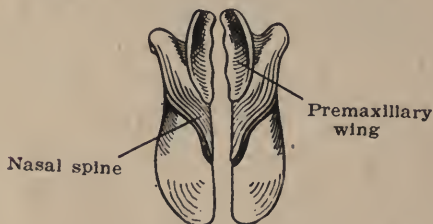


PLATE 8.

The premaxilla at birth.

horizontally forward from the anterior edge of the upper face of the premaxilla is a pointed process called the nasal spine. The superior surface of this is slightly concave. Also projecting from the upper face of the premaxilla in the middle line, but projecting obliquely upward and outward, is another process, the premaxillary wing. This process extends along the posterior two-thirds of the superior face of the premaxilla. Its upper surface is markedly concave. The inner edge of the base of this process is irregularly undermined so

that it can mortice into the corresponding process of the other premaxilla. The upper edge of the wing slopes outward and the root of the wing on its outer side is constricted by a smooth gutter, as if for a vessel or a nerve. Owing to this the wing has a narrow constricted base and a concave flaring superior surface. When the two premaxillary wings are placed together the wings mortice into one another so that they form a sizable gutter. Into this, in the complete septum, fits the tip of the vomer also a gutter. The premaxillary wings act as cleats on either side of the tip of the vomer to hold it in place. Their position controls the position of the vomer.

From birth up to six years of age the premaxillary wings increase in size but little. From this time on, however, they en-

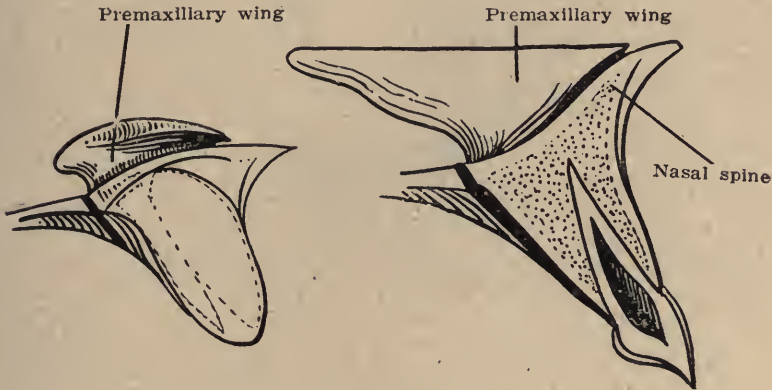


PLATE 9.

Fig. 1. Premaxilla at birth. Fig. 2. The premaxilla in the adult.

large rapidly, so that in the adult each wing measures about half an inch along its upper border and is a quarter of an inch in height. (Plate 9.) The premaxillary wing grows especially upward and backward so that its final form is triangular. The apex of the triangular piece of bone which constitutes the premaxillary wing points downward and rests just in front of the anterior palatine canal. These processes undergo a greater proportional growth than almost any other part of the septum. This is necessary in order that the premaxillary wings should not lose control of the vomer.

The premaxillary wings are said to fuse with the tip of the vomer at fifteen years of age. On account of their position and on account of this fusion with the vomer the two processes have usually been known as the sub vomer bones. Dissection has led

me to consider them not as separate bones but as processes of the premaxillae the same as the nasal spines. At birth the premaxillary wing is firmly united to the superior face of the premaxilla by a slender neck and apparently is a part of it. For this reason I call these processes the premaxillary wings.

As the antra enlarge and descend with the eruption of the second teeth the crest of the palate bone and the crest of the superior

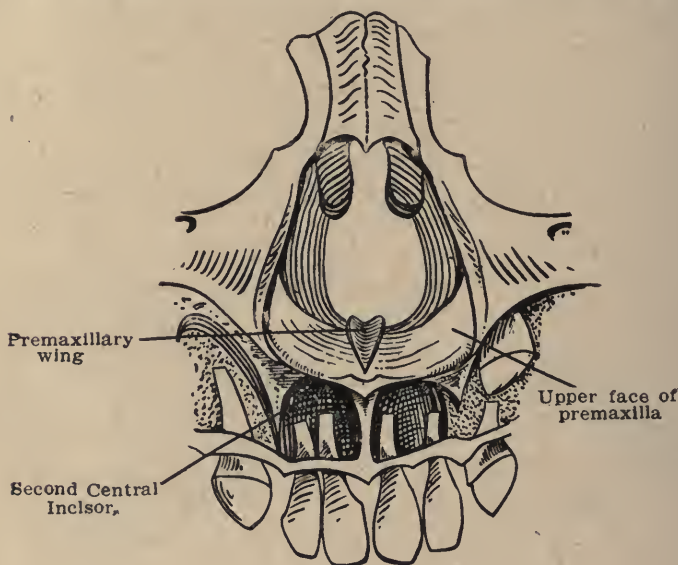


Fig. 1.

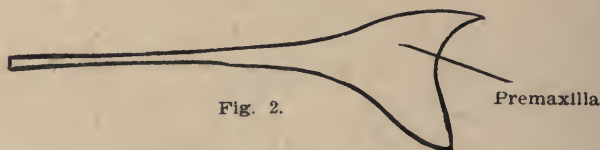


Fig. 2.

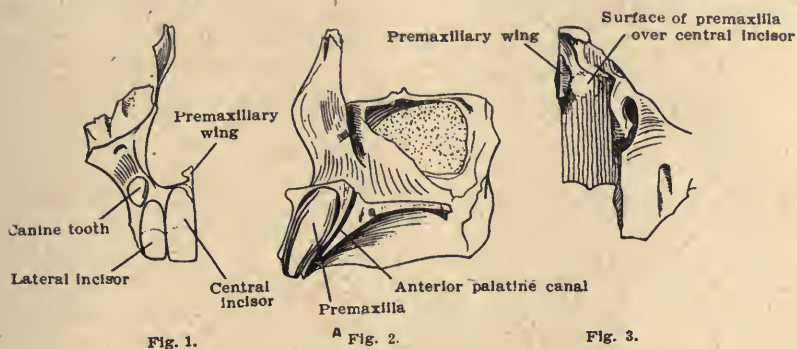
PLATE 10.

Fig. 1. Dissected alveolus of a child three years old. The upper face of the premaxilla is flat and fits accurately over the tops of the second incisor.

Fig. 2. Shows that the upper face of the premaxilla is almost flat.

maxilla grow upward. (Plate 10.) At the same time the nasal spines and the premaxillary wings also grow upward. Heretofore the superior face of the premaxilla has been flat like a plateau. This plateau disappears and the superior surface slopes downward and backward at an angle of forty-five degrees. The upward growth of the nasal spine is in great measure responsible for this. The spine in the adult makes a bony rim for the vestibule and turns the incisor plateau of infancy into a moat.

The fact that the inclination of the superior face of the premaxilla depends upon the teeth below it and changes as these erupt is shown prettily by dissections. At birth the upper rim of the hollow crown of the middle incisor fits snugly under the thin



A Fig. 2.

PLATE 11.

The premaxilla and the superior maxilla from a child of six.

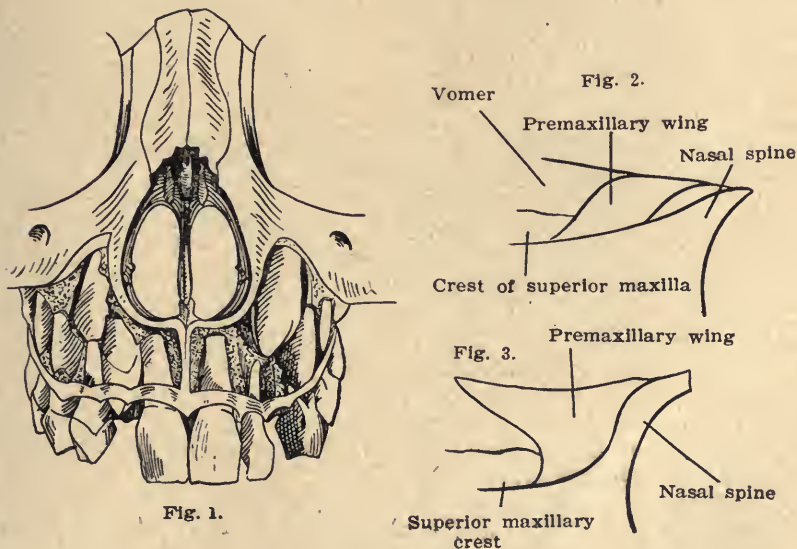


PLATE 12.

Fig. 1. Dissected alveolus of a child eight years. The nasal notch has lost its former triangular shape.

Fig. 2. The upper face of the premaxilla. The nasal spine and the premaxillary wing are beginning to grow upward.

Fig. 3. The nasal spine and the premaxilla have their adult growth.

upper face of the premaxilla. The upper rim of the crown is flat and so is the superior face of the premaxilla which is paper like in thickness and roofs it over. Plate 10, which is drawn from

the dissected alveolus of a three year old child shows this. As the flat rim of the upper part of the hollow crown gives place to the pointed root the superior face of the premaxilla changes from a flat plateau to a slanting surface. The form of the nasal notch changes in the meantime from a triangular aperture to a heart-shaped opening. Normally, therefore, the line of the superior

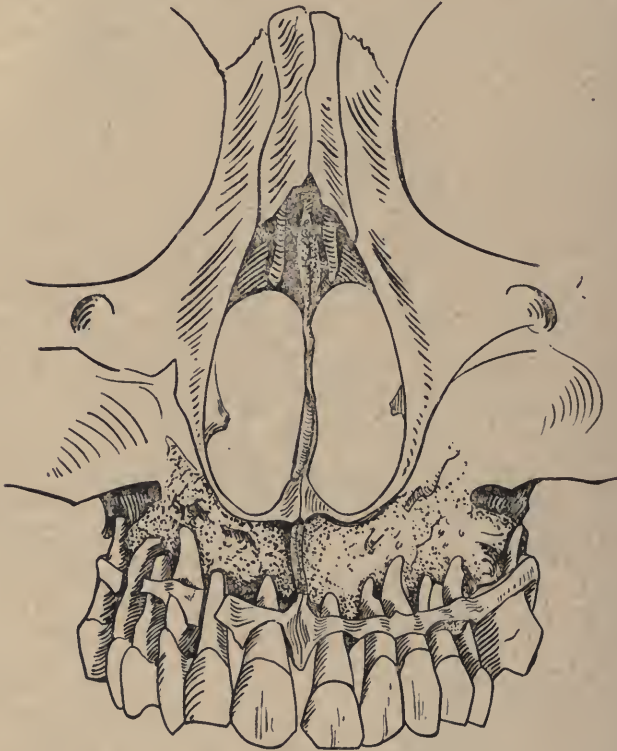


PLATE 13.

Dissected alveolus in adult. The nasal notches have the adult heart-shaped form. (See PLATE 12, Fig. 3.)

face of the premaxilla and the shape of the nasal notch are determined by the degree of eruption of the incisor teeth. Plate 11 represents the superior maxilla and the corresponding premaxilla at six years. In this specimen the upper rim of the crown of the central incisor is flush with the under surface of the superior face of the premaxilla and occupies the greater part of it. The layer of bone over the tooth crown is still paper thin, whereas the amount of bone over the lateral incisor is very thick. The lateral incisor could have but little influence as compared with the

central incisor upon the form of the superior face of the premaxilla and upon the premaxillary wing. (Plate 12.) All other parts of the alveolus except the part made by the premaxillae are buttressed by the walls of the antrum. (Plate 13.) The superior face of the premaxilla is free in the nose and not so buttressed. The form of this, therefore, can be readily altered.

Of late the old theory that the eruption of the teeth is caused by the formation of the root and pressure upon this as it elongates has been somewhat questioned. The new theory is that the eruption of a tooth is due to the increase of the blood pressure within the tooth sac. The tooth is forced out, so to speak, by hydraulic pressure. This may be true in part but it is not the whole truth. The anatomical facts which have just been given and the clinical findings which are to be given next in order show that the presence, or better the pressure, caused by the tooth root determines the form of the superior face of the premaxilla.

The blood pressure theory is of interest for this reason. Hutchinson's teeth is the name of a familiar deformity of the incisor teeth, especially of the central incisors. Inherited syphilis, which causes the deformity, involves in the nose chiefly the septum. Developmentally and practically, therefore, the premaxillae are a part of the septum. The incisor teeth are likewise in a way a part of the septum; and, in common with it, suffer from the syphilitic invasion. Thus it comes about that they are selected over all the other teeth for excessive malformation. The fundamental pathological change in syphilis is an endarteritis. If blood pressure has a part in causing the eruption of the teeth the pressure would be interfered with by the arterial changes. To interfere with the permeability of an artery is to interfere with the nutrition of the part which it supplies. Therefore we generally find that all the teeth in cases of inherited syphilis are stunted.

If the normal eruption of the incisor teeth causes a change in the upper face of the premaxilla the question is at once suggested: Does delayed or irregular eruption of the incisor teeth cause a still further change, a change which is of any significance in the pathology of the septum? It does. Within the last month I have collected forty cases of irregular and delayed eruption of the incisor teeth. The patients were mostly children who came to the clinic to have their tonsils and adenoids removed. The ages of the majority were between seven years and twelve. Five of the cases were adults. Through the kindness of Dr. L. B. LeGro, of Haver-

hill, I had the opportunity to examine four cases from his private practice where the history of the teeth was known from the beginning and where the teeth had been carefully followed and cared for. Since every point in connection with these cases could be followed I will give the cases in detail.

T. B., female, 8 years. Eruption of the incisors six months ahead of time. Right middle incisor fully down and in good line. Left middle incisor just appearing through the gum. Both first lateral incisors lost, neither second lateral incisor showing.

Nasal examination. The arch of the palate is moderately high. Both halves of the arch of the palate are of equal height. The wing of the premaxilla on the side of the left central incisor, the delayed incisor, is enlarged. There is a left vomer spur running back from this for one-half inch. The right premaxillary wing is not enlarged. The septum deviates moderately to the right, for three quarters of an inch back.

There is no nasal obstruction. Tonsils and adenoid were removed three years ago. No tonsils are to be seen at the examination.

G., male, 8½ years. Both central incisors fully erupted and in perfect line, at the present time, but the patient's history card states that the left middle incisor came down six months after the right middle incisor and six months after the normal time of eruption. The arch of the palate is normal and both halves are of equal height.

Nasal examination. There is a slight vomer spur on the left, and a slight deviation of the septum to the right beginning about a third the way up on the septum and running one-half inch back. There is a slight vomer spur on the right. No nasal obstruction. Tonsils and adenoid were removed three years ago. Practically no tonsils are to be seen.

M., female, 18 years. The left incisors and the left canine were delayed in eruption, and were irregular and crowded. Much regulating has been done to the teeth and the first bicuspid has been removed in order to allow the teeth in front to come into line.

Nasal examination. The premaxillary wing on the left is slightly enlarged with a slight deviation of the septum into the right side. The axis of the deviation is horizontal. There is moderate enlargement of the wing of the premaxilla on the right running back one-half inch. Half way back on the vomer-ethmoid junction there is a small sharp spur. The arch of the palate is normal. Both halves are of equal height. There is slight chronic rhinitis, and a moderate granular pharyngitis.

M., male, 9 years. All the upper incisors of the first dentition are still in place. Normally these should have erupted two years ago. The incisor teeth are regular in outline but are movable on pressure as if they were on the point of being cast off. The nasal bones are in good line. There is no history of trauma. There is no nasal obstruction. The arch of the palate is normal and both halves are of equal height.

Nasal examination. Large vomer spur is on the left, running well back. The left premaxillary wing is much enlarged, the right premaxillary wing slightly enlarged. The septum deviate into the right nostril. The axis of the deviation is horizontal.

These four cases are from families in good circumstances so that the teeth have had every chance. In all, the line of the nasal bones was straight. In all, careful questioning of the parents brought out no history of trauma. In the first three cases there was moderate delay and irregularity in the eruption of the incisor teeth. In these examination showed an enlargement of the premaxillary wing on the side of the delayed tooth and a slight deviation of the anterior part of the septum. In the fourth case the first teeth were retained two years beyond the time when they should be shed normally. In this case there was a very large premaxillary wing on one side with a large vomer spur running well back from it, a moderate enlargement of the other, and in addition a deviation of the septum into the opposite side. So marked was the deviation that any increase from continued growth along the present vicious lines or any sudden increase from trauma must produce obstruction.

The case of the girl of eighteen is interesting because she started with delayed and crowded teeth. Her teeth were carefully regulated, however, and brought into line so that her septum escaped with but slight deformity. The lesson of such a case is obvious. At the time that I saw the second of these four cases both central incisors were equally and fully erupted and in good line but the history card showed that the left middle incisor came down six months after the right middle incisor and six months delayed. In the nose, on the side of the lagging incisor, examination showed that the premaxillary wing was enlarged and that there was a small vomer spur on the same side. The septum deviated slightly to the right. From these cases it is seen that the history of the teeth is to be read in the nose.

The results of the findings in the rest of the forty cases can be put very briefly. They are as follows: Wherever there was moderate and equal delay in the eruption of the central incisors the premaxillary wings were symmetrically enlarged at the floor of the nose on both sides. In such cases there was usually little if any deviation of the septum and there was no vomer spur. Where, however, there was marked inequality and delay in the eruption of one central incisor as compared with the other central incisor, on the side of the backward tooth the premaxillary wing was much enlarged or displaced and the quadrangular cartilage tipped out of its bed along the vomer ethmoid suture. As a rule the long axis of the deviation was antero-posterior, roughly paralleling the spur,

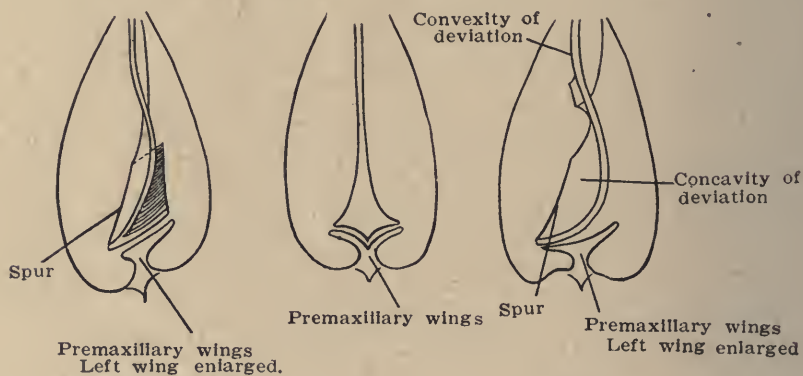


Fig. 1.

Fig. 2.

Fig. 3.

PLATE 14.

Diagrammatic drawings of the types of deviation due to deformity of the premaxillary wings.

Fig. 2. Both premaxillary wings turned outward, causing a double basal spur of the septum.

and the upper part of the cartilage was bowed toward the spur. Accompanying this horizontal deviation there was often a certain amount of sigmoid deviation, the axis of which was vertical. It is fairly common to find the root of the lateral incisor mounting into the outer part of the floor of the nose. Even when the lateral incisors are crowded out of the dental curve and are placed directly behind the central incisors, a deformity which is striking and one from which you would expect much at first glance, they seem to have but little influence on the septum as compared with the central incisors.

The findings of these forty clinical cases are borne out and the details of their formation explained, by the dissection of twelve

cases in which an enlarged or displaced premaxillary wing caused a deviation of the septum. These specimens showed that if the pressure caused by the premaxillary wing is applied to the septum directly in its vertical axis, the lower edge of the cartilage stays in its bed but that the lower part of it folds sharply upon itself, the axis of the fold paralleling the upper border of the vomer. (Plate 14.) More often, however, the force seems to be applied a little to one side of the vertical axis of the septum. When this happens, the lower rim of the cartilage is forced out of its groove be-

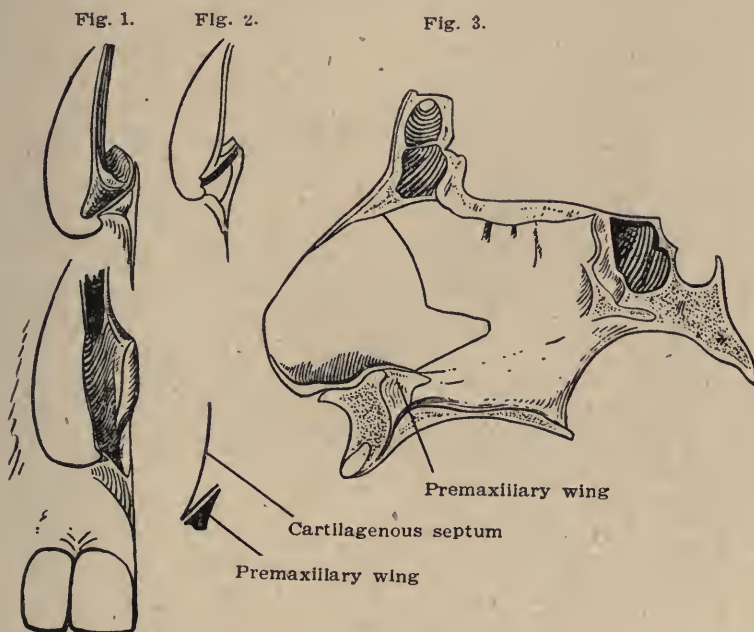


PLATE 15.

Specimen of deviation of the septum due to enlarged left premaxillary wing. Fig. 1. Dissection of the groove of the premaxillary wing. Left wing enlarged. Fig. 2. Scheme of the deviation.

tween the retaining premaxillary wings and the two leaves of the vomer and curls upward and outward. As it does this it breaks off one premaxillary wing or stunts its growth and does the same thing to one leaf of the vomer groove. This results in the familiar spur along the vomer ethmoid articulation. (Plate 15.) The concavity of the lower portion of the cartilage about half way up the septum merges into a compensatory convexity. These dissected specimens bear out the clinical findings that the convexity generally is toward the spur and away from the enlarged premaxillary wing. (Plate 16.)

Occasionally the reverse of this is found. The spur is on the side of the convexity and seems to crown it. The enlarged premaxillary wing is found in the dissected specimen to make an anterior basal spur which runs for a quarter of an inch to an inch backward. Further, when the two premaxillary wings are enlarged but slightly and are enlarged equally they often tip outward and make a small anterior basal spur of either side of the septum. Where, however, both premaxillary wings are evenly enlarged to a considerable extent and the pressure caused by this enlargement is not equalized by

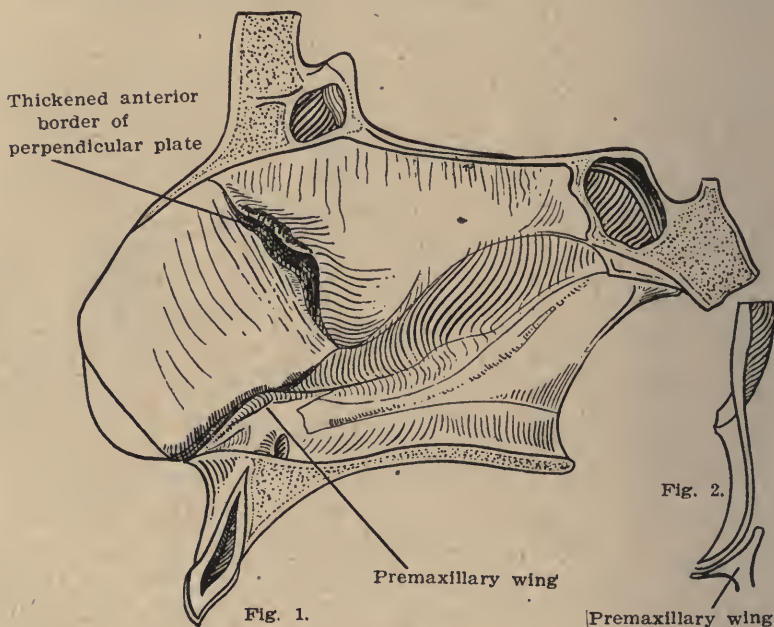


PLATE 16.

Fig. 1. Deviation due to enlargement of the premaxillary wing.

Fig. 2. Dissection of the deviation.

their turning outward, as in the case just described, the tip of the septum is first pushed upward and then to one side. (Plate 17.) The septum in this case yields instead of the premaxillary wings. I found this condition in the skull of a three year old child.

The spur, as has just been said, usually is on the side of the convexity and often seems to crown it. The character of the spur naturally varies with its formation. Where the spur is made by a simple folding of the lower part of the cartilage upon itself the spur is all cartilage. On the other hand, where the cartilage breaks down one leaf of the vomer the spur would be cartilage above and

bone below. Where the vomer groove is distorted but not broken the spur would have a shell of bone above and below with a core of cartilage between. If one premaxillary wing is broken off or atrophies from pressure and the same thing happens to the corresponding leaf of the vomer the spur would again be all cartilage. It is common in the clinic to see a vomer spur end about two-thirds the way back on the septum in a sharp spine like projection. A dissection of such a case shows that this formation is due to the fact that the two leaves made by the lower edge of the perpendicular plate of the ethmoid and the two more pronounced leaves of the upper border of the vomer turn half round until they coincide

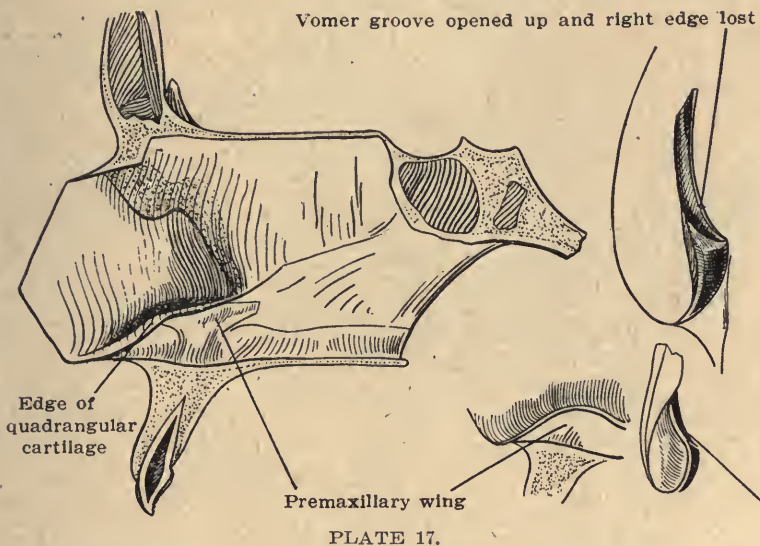


PLATE 17.

Deviation of the septum due to the enlargement of the left premaxillary wing. Small figures, the dissected anatomy of the deviation.

with the long axis of the septum and then bend sharply outward and burst open. (Plate 18.) This spine-like excrescence may be all bone and very hard or it may have a core of cartilage.

Enlargement of the nasal spine, as well as enlargement of the premaxillary wing, can cause spurs and deviations of the septum. Enlargement of the nasal spine does occur but it is less common to find examples of it in the dissecting room than it is to find enlargement of the premaxillary wing. It should be borne in mind however, that the nasal spine is the cause of deviations in certain cases. In the cleaned skull the nasal notch on the side of the en-

larged premaxillary wing is higher than the notch of the other side. A good X-Ray will occasionally demonstrate this in the living.

I feel that good anatomical and clinical evidence has been given to show that enlargement of the premaxillary wings, the enlargement being due to delayed eruption of the incisor teeth, must be considered as important cause of deviations of the septum. There is yet more to be said about the teeth. Not only may the anterior openings of the nose be of unequal height and size, but also the posterior openings, the choanae. (Plate 19.) The anterior central teeth produce the deformity in front and what might be called the posterior central teeth, the upper wisdom teeth, produce the deform-

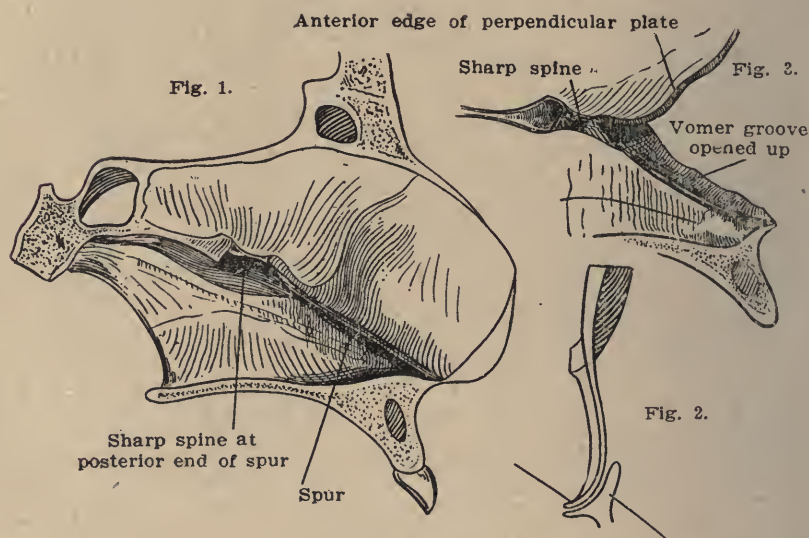


PLATE 18.

Deviation of the septum caused by enlargement of the left premaxillary wing.
Fig. 2. Anatomy of the deviation and spur.

ity behind. The molar teeth and especially the wisdom teeth are brought into place by the downward growth of the tuberosity of the superior maxilla in which they are lodged. This shuts into place like a hinged box cover. At times it does not shut completely down leaving the wisdom teeth to erupt at a vicious angle. The palate bone which forms the outer side and the floor of the choana is fastened to the inner side of the tuberosity of the superior maxilla and must follow its movements. If, therefore, the normal downward growth of the tuberosity, and in consequence the normal eruption of the wisdom teeth, is disturbed, this can cause an inequality of the nasal notches. When it occurs it probably plays

a certain part in upsetting the equilibrium of the different parts of the septum.

In the four clinical cases which were given in detail I was careful to state that in all, the two halves of the arch of the palate were of equal height. I did this because there is a third cause of deviations of the septum which if it is connected with the teeth is connected with all the teeth of one side not as in the other cases with special teeth. The third cause is unequal descent of the antra. It results in asymmetry of the whole of one-half of the palate. In such in-

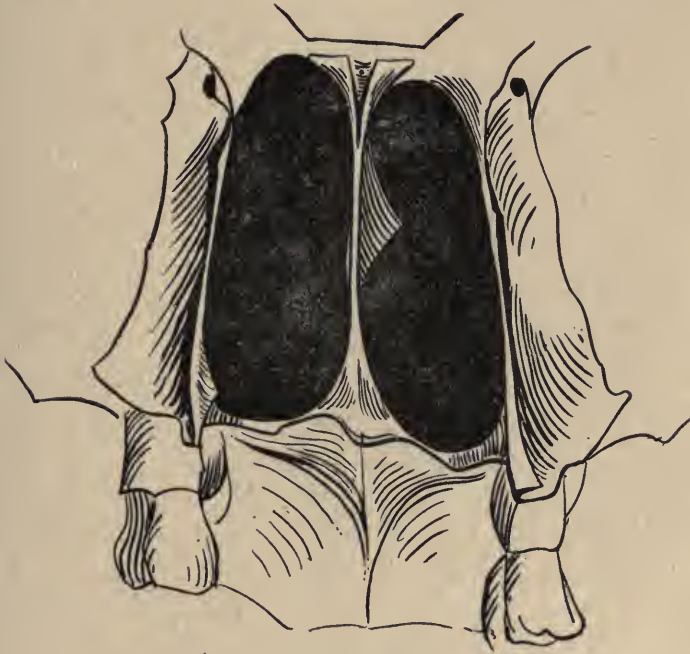


PLATE 19

Inequality of the choanae due to irregular descent of the antra. The left antrum has not descended as low as the right, so that the left choana is higher than the right choana.

stances one-half of the palate is higher than the other half. Plate 20 illustrates this condition. The left nasal notch, the left choana, and the half of the palate between, are higher than the corresponding parts of the other side. This has caused hypertrophy and displacement of the left premaxillary wing and an opening up of the gutter made by them, and the displacement of the tip of the vomer toward the lower nasal notch. This inequality in the halves of the palate is readily seen in the living by looking for it

in the mouth. I found an example of this recently in a child of six years. Small differences in the antra are hard to make out in the X-ray plate, but in one of my adult cases the plate showed clearly that it was present.

When one nasal notch is higher than the other nature often attempts to equalize the deformity. For example, if the right nasal notch is higher than the left just the reverse of this may be true of the choanae. In these cases of inequality of the halves of the

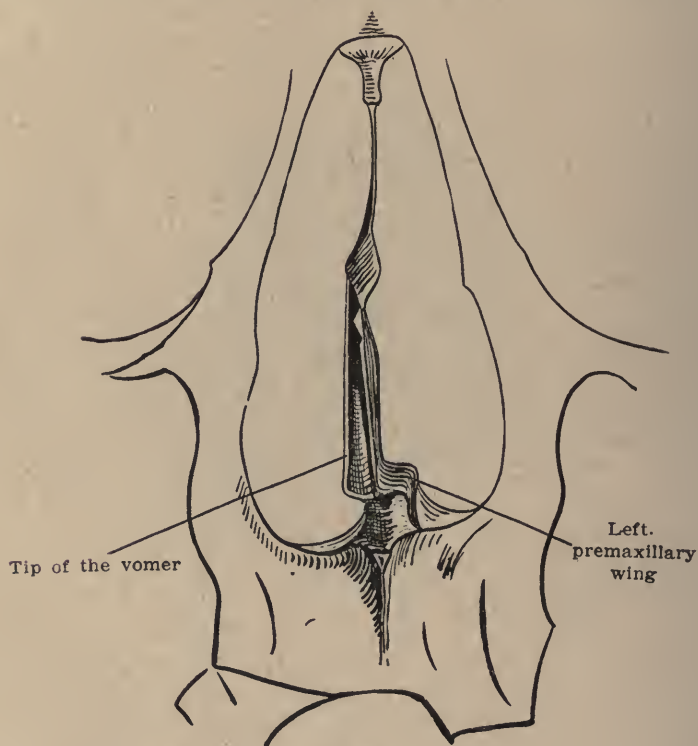


PLATE 20.

Specimen shown in Fig. 19 seen from the front. The left nasal notch is higher than the right. The left premaxillary wing is enlarged and has thrown the tip of the vomer to the right.

palate the asymmetry may extend to the whole half of the head, but as a rule it is confined to the bones which make the hard palate and have to do with the teeth. Where, however, there is asymmetry of half of the head the nasal bones and the septum share in the general asymmetry. In such cases the cartilage of the nose both externally and internally follows the line of the deviated nasal bones.

The last great cause of deviations of the septum is trauma. It used to be argued against trauma that the less civilized races, where there is the most chance for trauma, have straighter septa than the civilized races. This has been in great part disproved by the examination of prehistoric skulls. The negro may have a straighter septum than a white man. If he does it is probably due to the fact that the negro has the heavy premaxilla of the carnivora. The resemblance is very striking. The bony vestibule of the nose of a negro is wide open and flaring and roofed with thick bone, just like, for example, the premaxilla of a bear. Owing to the strength of the premaxilla his septum is kept in good line.

The septum at birth for the greater part is cartilage. It is so resilient that one can study the effect of trauma upon it with ease. For the first year the articulations about the superior maxilla are so soft that it is possible by upward pressure in the mouth to collapse the face to a certain extent. It is somewhat startling to do this for the first time. By putting two fingers of each hand in a baby's mouth under the premaxillae and getting counter pressure upon the skull with the thumbs the face can be shut together very appreciably. This spring of the face must be a great safeguard during birth and early in infancy. I have often wondered how the septum fared at birth. By experimenting with a wet specimen of a baby's septum it is easy to see what must happen. During birth the nose is flattened with the face. In instrumental deliveries the flattening is extreme. In order for this to take place the septum folds upon itself vertically. After birth either the natural spring of the cartilage or the first wiping of the baby's nose straightens this deviation out. An instrumental delivery, however, might readily throw the septum out of its groove in the premaxillary wings or break one of the leaves of the vomer and so make the deviation permanent.

If pressure is applied to the baby's septum from below the cartilage folds horizontally the same as a playing card in the half closed palm. The septum is not ossified to its full extent until the eighth year. Up to this time, therefore, blows upon the septum, unless extreme, are probably taken care of by the spring of the cartilage. Great violence could either jump the tip of the vomer out of its bed in the premaxillary wings or fracture one or both of these wings and one or both of the leaves of the vomer.

After the perpendicular plate of the ethmoid has ossified all that it is to ossify its anterior border plays an important part in

deviations caused by trauma. The under surface of the median border of each nasal bone is supported from above downwards usually for two-thirds of its extent by the superior border of the perpendicular plate of the ethmoid. The anterior border of the perpendicular plate of the ethmoid, therefore, starts from a point a third of the distance from the tip of the nasal bone to its root and runs obliquely downward and backward to meet the upper border

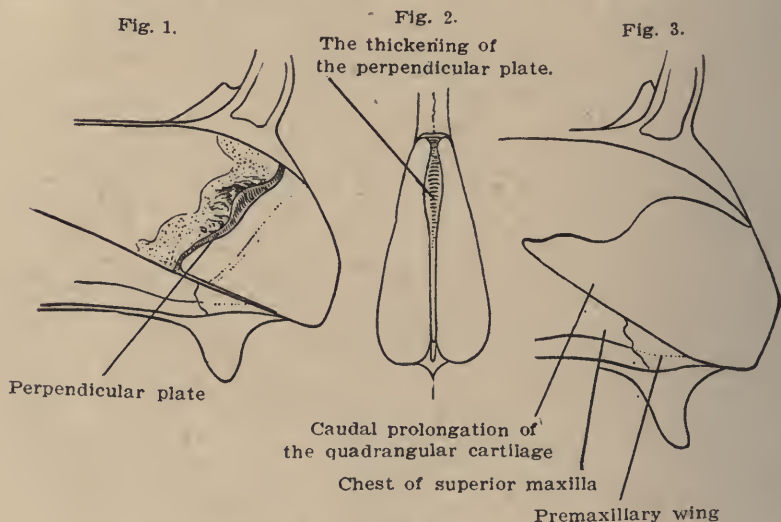


PLATE 21.

Fig. 1. A part of the quadrangular cartilage has been cut away in order to show the thickening of the anterior edge of the perpendicular plate of the ethmoid. This edge is ossified for some distance back.

Fig. 2. The thickening of the perpendicular plate.

Fig. 3. The anterior edge of the perpendicular plate runs horizontally backward and makes a large caudal prolongation.

of the vomer just behind the premaxillary wings. (Plate 21.) The direction of the anterior border of the perpendicular plates of the ethmoid, however, is subjected to great variation. Instead of being roughly vertical as has just been described, it may run backward almost horizontally, in this way increasing the size or the caudal prolongation of the quadrangular cartilage, and turning the anterior inferior angle of the perpendicular plate of the ethmoid into a tongue-like projection.

Where the direction of the anterior border of the perpendicular plate of the ethmoid is practically vertical it is well fitted to withstand trauma. In such a case the force of a blow on the nose directly

from the front is transmitted by the quadrangular cartilage squarely to this edge of the perpendicular plate and most of the force expands itself there. A hard blow produces a vertical deviation or folding of the quadrangular cartilage beginning below at the premaxillary wings and running upward roughly paralleling the anterior border of the perpendicular plate of the ethmoid. Experimental work on the cadaver has proven that the articulation between the anterior border of the perpendicular plate of the ethmoid and the quadrangular cartilage is often too firm to be broken except by the greatest force. Therefore the deviation parallels the synchondrosis but does not involve it.

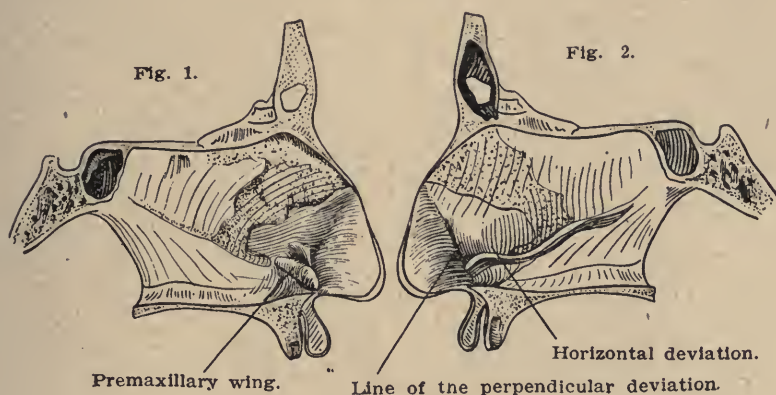


PLATE 22.

Plate showing a perpendicular deviation of the septum with enlargement of the right premaxillary wing. This type of deviation is characteristic of trauma. In this case, both the displacement of one premaxillary wing and the deviation were probably caused by trauma.

Where the anterior border of the perpendicular plate of the ethmoid is vertical, it is adapted to withstand trauma, but where this border runs backward horizontally, it loses its function of a buffer. In this case it is not rightly placed to receive and withstand the effect of a blow from the front. The caudal prolongation directs the force beneath and beyond it, well into the middle of the septum. (Plate 21.) The tip of the vomer is forced from its bed between the premaxillary wings and one or both of these processes are broken. The caudal prolongation is driven as a wedge between the upper border of the vomer and the tongue-like projection of the anterior inferior angle of the perpendicular plate of the ethmoid. The anterior inferior angle of the perpendicular plate bends in consequence and bends or breaks one leaf of the vomer groove. The size of the

caudal prolongation therefore, in great measure determines the form and the extent of the deviation produced by trauma.

The anterior edge of the perpendicular plate of the ethmoid is a natural buffer not only on account of its position but also on account of its thickness. The upper half of this edge is the thickest part of the septum. This thickening occurs on a level with the middle turbinate, and extends backward into the body of the ethmoid plate from a quarter to half an inch. Often this thickening is covered with exostoses. It would seem that these are probably due to the constantly repeated small injuries of childhood.

In short, a sharp anterior vertical deviation is characteristic of trauma. Such a deviation begins below at the premaxillary wings and runs obliquely upward paralleling the anterior edge of the perpendicular plate of the ethmoid. The perpendicular deviation almost always merges into a horizontal deviation which includes the anterior inferior angle of the perpendicular plate of the ethmoid. The shape of this part of the ethmoid plate materially influences the form of the deviation. (Plate 22.) This horizontal deviation generally turns to the same side as the vertical deviation.

Excessive trauma, applied either from the front or from the side, causes deviations and fractures of the septum which cannot be brought into any classification.

Treatment. I have nothing to say about treatment. That is not included in my subject. I wish, however, to add a word concerning prophylaxis. The obvious thing to do is not to leave the first incisors in too long. Dentists as a rule object to early extraction of the first teeth, because they say that the second teeth erupt irregularly if the first teeth come out too soon. If this is so, there are two horns to the dilemma, namely, leave the first teeth in as long as possible and deform the septum or remove the first teeth early and deform the second, but keep the septum straight. Most men and all women would prefer straight teeth and a crooked septum to a straight septum and crooked teeth.

Just at present there is a good deal in dental literature about widening the arch of the palate and so widening the nasal fossae. The old fashioned split plate would undoubtedly accomplish this. It is yet to be demonstrated beyond a doubt that the modern methods accomplish more as a rule than a change in the angle of the teeth and an apparent widening of the arch. It is to be hoped that it will soon be proved that the nasal fossae can be widened by widening the arch of the palate. Because, if it can be brought

about to any appreciable extent, the dentist can do much to prevent and to correct deformities of the septum. Dentists maintain that they can ensure by treatment the regular and normal eruption of the incisor teeth. By accomplishing this they can save many a septum from deformity.

Summary.—A large number of deviations of the septum are caused by asymmetry in the development of the bones which make the hard palate. This inequality of development is usually due to delayed or irregular eruption of the incisor teeth, especially of the middle incisor. Delayed eruption of the teeth is caused in great measure by some disturbance of nutrition. When the eruption of one central incisor is sufficiently delayed it causes a deformity or hypertrophy of the premaxillary wing above it. This distorts the retaining groove made by the premaxillary wings. As a result, the septum slips from its bed in the vomer, and the groove made by two leaves of the vomer spreads open, one leaf or side of the V disappearing. This produces a spur along the upper edge of the vomer. As the cartilaginous part of the septum slips from its bed, the lower edge curls upward and outward, so that its lower portion becomes concave. Higher up on the septum this concavity gives place to a compensatory convexity. The convexity generally is toward the spur. On the side of the delayed tooth a short basal spur indicates the enlarged premaxillary wing. The upper wisdom tooth may deform the septum posteriorly. Occasionally deformity of the septum is caused by asymmetry of one half of the palate. This asymmetry shows in the nasal notches anteriorly and in the choanae posteriorly and in the mouth. Such extensive asymmetry is due to unequal descent of the antra. After the teeth are fully erupted and in good line there remains no evidence of the disturbance caused by their delayed eruption except in the nose.

Trauma as well as delayed eruption of the incisor teeth can displace the premaxillary wings and distort the vomer groove resulting in spurs and causing deviations anteriorly and posteriorly. The best explanation for the slight anterior deviations which are found so constantly is some fault in the eruption of the incisor teeth. Abundant dissecting room findings prove that deviations so started may extend far back on the septum and become obstructive.

828 Beacon Street.

PRIMARY MELANOSIS OF THE PALATE. NASO-BUCCAL FISTULA OF RECENT SARCOMATOUS ORIGIN.

BY J. N. ROY, M.D., MONTREAL, CANADA.

It is well known that there exist strange freaks of nature which till now the most profound observers fail to explain. In medicine, numerous examples could be cited; among others, primary melanosis of the palate is, I think, worthy of note. The histologist could easily tell us what melanosis consists of, but he would find it very difficult indeed to explain how and why that melanosis became primarily localized in the palate. Normally the mucous membrane of the human palate is of a pale rose color and whenever pigment appears it is symptomatic of a pathological process.

A glance at comparative anatomy shows that, in general, the palate of animals is whitish in color, and the mucous membrane is undulated with numerous transverse furrows. However, the horse, the cow, the dog, the deer and the fox may normally have a dark palate. The maki, on the other hand, has always a pigmented palate.

The caprices of nature must puzzle the biologist and make him wonder what could be the physiological explanation of how a white palate and a dark palate could exist in the same race of animals.

If the physiology of animals is so capricious, it is not at all the same thing with human physiology. With man, melanosis of the palate has always a serious signification; either it is a precursory symptom of future disease, or it is a complication of an already existing tumour, or else it begins with the new-growth.

Medical literature is very poor in notes on this subject; I have been able to find only two other similar cases reported; therefore I have thought it might be of interest to record the present case, and I would draw special attention to the beginning of this condition which dates back twenty years, and to the naso-buccal fistula of recent sarcomatous origin.

In September, 1906, J. D., a blacksmith, 43 years of age, consulted me at the Hotel-Dieu. He related that in 1886, he remarked on the median raphé of the vault of the palate a small round spot of a diameter of about three millimeters. This spot was not elevated and caused no trouble. A year before he had slightly injured

1. Read before the Canadian Medical Association, Montreal, September, 1907.

his palate with the stem of a clay pipe. The hemorrhage was trifling and the wound healed quickly apparently leaving no traces. During the following twelve years, this spot increased in diameter to about six millimeters without, however, becoming prominent. The only symptom he noticed was slight roughness to the tongue on pressure. He consulted a doctor who prescribed gargles and applications of tincture of iodine. During the first twelve years, the melanosis was painless, but after the applications of iodine pain appeared. Pigmentation extended gradually to the surrounding parts, and the mucous membrane became granular and irregular. Hard dark masses with a hemorrhagic tendency began to form. Four years later, all the space between the dental arch of the superior maxilla was filled with melanotic granulations. The feeling of local irritation succeeded the pain caused by the applications of iodine, which were discontinued for that reason. The irritation disappeared temporarily when the patient rubbed the mass with his tongue. The last four years, the lesion became deeper. Till then the whole palate was in a state of melanosis. Then slowly there came a depression more marked on the left side. We can not trace at present any swelling antecedent to this depression. The palate then became rougher and furrows separated small masses which apparently were increasing in size. Early in September last, the patient while attempting to suck perceived the existence of a naso-buccal fistula. Neither hemorrhage nor sup-puration were noted.

On examination it was remarked that the melanosis invaded the whole hard palate. Granulations of a brown and black color and of various sizes were scattered around. They were hard and showed no tendency to hemorrhage. The left side was greatly depressed and at the union of the anterior two thirds with the posterior third the probe passed into the left nasal cavity. Pain was felt only if irritating food was taken, or if cold air passed quickly through the fistula. There was a slight discharge and slight necrotic odor. A mass of granulation tissue at the orifice of the fistula prevented liquids from entering the nasal cavity.

The voice was nasal. Taste was dulled; no dysphagia, but loss of pharyngeal reflexes. Gums and cheeks showed no melanosis.

The patient has always been a great smoker, he used to chew tobacco and took no care of his teeth which are quite discolored. The upper teeth are healthy, except the first left molar which shows caries to the third degree. The third right molar has been extract-

ed. The second left lower molar has also been extracted. The other teeth are quite healthy.

An anterior rhinoscopic examination shows a hypertrophic rhinitis on the left side. The septum is depressible and oedematous, and a small cartilaginous spur prevents the perforation being seen. On the right side, the septum is in the same condition and there is hypertrophy of the inferior turbinals.

No history of epistaxis or nasal discharge.

Posterior rhinoscopy shows hypertrophy of the posterior ends of the lower and middle turbinals. The posterior end of the septum is tripled in diameter. A whitish infiltration appears to come from the middle part of the septum and gradually grows more marked as it extends backwards.

At this rhinological examination, I have not found any melanosis.

The pharynx is slightly congested, the larynx normal.

Diaphanoscopic examination shows the right antrum to be transparent and the pupil luminous. On the left side the cheek is darkened and the pupil obscured. By means of Mahu's method, I examined the capacity of the left antrum, and find it holds two cubic centimeters of water which returns from the left nostril quite clear.

Cervical lymphatic glands on left side appear slightly hypertrophied.

A close examination of the eyes shows they are normal.

The iris is of a clear grey color without any abnormal pigmentation.

Refraction is:

Right eye $90^{\circ}+0.25$ V=1

Left eye $90^{\circ}+0.25$ V=1

The patient has always resided in the country and has enjoyed excellent health. The only sicknesses he has had were pneumonia in 1888, and mild cystitis in 1894.

There is no history of tuberculosis or lues.

He has made use of alcohol without abuse.

Married for 11 years, he is the father of seven children. The two eldest died of convulsions in infancy. The others are in good health.

All his ancestors lived to a good old age.

There is no cancerous history.

His brothers and sisters are in excellent health.



Primary Melanosis of the Palate.

On inspection of the skin, there are no pigmented spots. The skin is normal except for a slight subicteric shade.

The examination of the different organs shows nothing abnormal.

Urine analysis shows a density of 1022. There is no sugar, or albumen, but a trace of urobilin.

Examination of the blood is of no special interest. There is nothing abnormal about its composition, and the number of red and white corpuscles varies but slightly from the normal. The presence of pigment in the blood was negative to a most minute examination.

Till now, the cause of this palatine perforation remained obscure.

Although it was impossible to trace lues in this patient, I prescribed large doses of Mercury and Iodide of Potassium awaiting the microscopic report on a small granulation removed for examination. Menthol and Boric Acid salve, and a mouthwash of Chlorate of Potassium completed the medical treatment. Hygienic treatment consisted in forbidding all irritating food and ordering cleansing of the teeth.

In this case we did not think it necessary to search for the *Spirochaete Pallida* of Schaudinn as it is generally admitted that this micro-organism is found only in primary and secondary lesions. As to the bacillus of rectilinear shape its presence is questioned in tertiary lesions.

My friends, Dr. St. Jacques, professor at Laval University, and Dr. Hingston, F. R. C. S.-Ed. returned the following report upon the small piece removed:

"On microscopic examination, the section appeared to measure about 5 millimeters in diameter. The epithelial layer still remains though varying in thickness in some parts.

"The cells of the deeper layers are in general well divided from the underlying parts; but in some places they appear to merge into the submucous tissue.

"The submucous space is filled with cells of irregular shape, various size and appearance. In some places they are very close to each other, in others they are well separated. Some of the cells are round, others very irregular. Mitosis not marked. The nuclei vary much in size and shape. The intercellular spaces are filled with granular substance, and here and there are seen free blood corpuscles. In one place, there are mucus glands altered in shape

but showing no signs of malignancy. Blood vessels are scarce but blood is seen in spaces without vessel-walls, typical of sarcoma. The cells of this mass are spread with no order whatever. Melanotic pigment is seen and is both intra and extracellular.

"Diagnosis: Melanotic sarcoma resembling melanotic endothelioma."

Seen again in November last, the patient said he was in the same state. The lesion appeared to have become deeper especially anteriorly. The vault of the palate was becoming denuded and in places small necrotic masses of bone were seen. There remained very little sensitiveness on the left side. He was very anxious to hear the result of the microscopic examination, and knowing that his condition was serious, he told me he would not consent to operative interference. He was given the necessary explanations, and the gravity of his state made clear. Operative measures were discussed together with the necessary mutilation, possible complications and probable recurrence. Having again refused the operation, he was given hygienic advice. A Resorcin gargle and Fowler's solution were prescribed.

He returned to the country where he now lives and came to see me in February and April. As yet there is no pain, but the lesion is rapidly increasing. The vault of the palate is becoming more denuded, and small sequestra become detached, thus increasing the size of the fistula. This atypical sarcoma so long indolent appears to be making up for lost time, and makes us foresee a fatal ending in the near future.

This case appears to be of interest from several points of view. First should we put the beginning of this melanosis back 21 years, and look upon it as consecutive to injury received at that period. We know that all cutaneous regions strongly or chronically irritated can become pigmented whether the irritation be physical, mechanical or pathological. Could that law be applied to our case? It would be difficult to admit it as the tissues of the human palate have not the property of producing melanotic pigment.

Should we call in a parasitic theory or attribute the cause of this melanosis to the melanin of the blood? Any hypothesis we could lay down would be most problematical for, we must admit, our knowledge on the etiology of this condition is extremely vague.

This neoplasm surely did not begin with the melanosis, as it is generally admitted that melanotic sarcoma has a very rapid growth. By the clinical history, we see that the pigmentation dates back 20

years; that the evolution was very slow, and that the symptoms were slight. Sixteen years after it had appeared, the mark was only six millimeters in diameter, and was on the level with mucous membrane of the palate. Perhaps the irritating action of the iodine caused the increase of the growth of the tumor in the breadth and depth. Perhaps it was mere coincidence. The naso-buccal fistula appeared September last, and since then has rapidly progressed. From these facts, I am inclined to think that this primary melanosis was benign in nature, and that in late years a neoplasm appeared in this location and became infiltrated with pigment and gave to this lesion an invading; destructive and openly malignant growth.

Dalbet affirms that all melanotic tumors arising elsewhere than in the eye and the skin are sarcomatous. The microscopic examination of tissue removed a year or two ago would have been of great interest. Perhaps at that moment we would have found an endothelial tumour. Pathologists do not agree on the histological transformation of endothelioma and sarcoma. Monod and Arthaud hold that sarcoma is an aggravated form of endothelioma. At present our tumor is certainly sarcomatous although in places an arrangement of cells resembling endothelioma are found.

What is the prognosis? We know that of sarcoma the melanotic variety is one of the most serious. Moreover when the growth invades the palatine vault and perforates it, the evolution is rapid and invariably has a fatal termination.

If operative measures had been attempted recurrence probably would have occurred on account of the growth of the lesions towards the nose and left antrum. We would also have had the risk of post-operative complications and considerable disfiguration.

In conclusion, I should like to remark how unusual this case is, presenting a primary melanosis of the palate without coexisting lesions of the eye or skin, a slow evolution of twenty years, and a recent rapid sarcomatous growth.

379 Rue St. Denis.

SUPPURATION IN THE TEMPORAL FOSSA.*

BY H. GIFFORD, M.D., OMAHA, NEB.

I happen to have seen two cases in which pus from the middle ear instead of following the lines described in most text-books and breaking through on the outer surface of the mastoid, or into the digastric fossa, has penetrated into the temporal fossa.

One of these patients was a girl of seven years, who was sent to me with the history that a month before, the left ear began to pain and discharge. Some days later a swelling appeared above and in front of the ear. This was opened by the family physician, but the history does not state whether he found any pus or not. The swelling continued, however, and during the twenty-four hours before she came to me the lids of that side became oedematous. I found a rather anemic girl with the right ear normal, the left ear discharging non-foetid pus through some part of the drum head which could not be clearly made out on account of the swelling and adherent epithelium. Between the left ear and the eye the tissues along the zygomatic process were very much swollen, the swelling extending out into the eyelids. There was a small opening in the skin half way between the ear and the eye which was not discharging any pus; deep fluctuation could be felt. Temp. 103° . No decided swelling nor tenderness over the mastoid. Under chloroform, two incisions were made down to the zygomatic process which was found to be bare; and much pus was evacuated; paracentesis was also made as the posterior part of the drum head seemed to be bulging. Symptoms improved for ten days, but then the temperature again rose to 103° and more swelling was apparent above the auricle. Incision here down to the bone evacuated more pus. Two days later the mastoid was opened and pus found in the antrum, but the cells were not involved to any extent; after this the recovery was uneventful except for a peculiar pemphigus-like inflammation of the auricle which subsided under lead and opium dressing.

The other patient was a boy whom I saw only at his home and the exact dates of whose affection I can not give. The main facts of the history, however, are as follows: At the age of ten years, in the course of an acute attack of inflammation of the left middle ear

*Read by invitation before the Western Section of the American Laryngological, Rhinological and Otological Society, Denver, Colo., February 16, 1907.

with the escape of pus from a small perforation in Shrapnell's membrane, he developed a large swelling with tenderness and very slight redness in the preauricular region, which kept increasing slowly with very little pain, for several days. I then, although no fluctuation could be made out, made an incision about an inch in front of the meatus, passing the knife into a depth of about an inch just above the upper margin of the zygomatic process. A few drops of pus escaped and the swelling gradually subsided and the discharge from the ear ceased. A year later, after catching cold, the left ear began to discharge again through the old perforation, and in a few days the tissues in front of the ear swelled to twice their ordinary thickness. This time, however, the swelling subsided under the use of hot applications and the discharge from the ear ceased on the same treatment as that used before, namely syringing with warm water and the instillation of a mixture of equal parts of saturated boric acid solution and 15 volume peroxide of hydrogen. The next winter was passed without any recurrence of ear trouble, and in the succeeding winter, the fourth after the first attack, the same sequence of events occurred. The boy caught cold, the left ear ached a little and then began to discharge through the opening in Shrapnell's membrane; the preauricular swelling appeared and slowly and steadily increased, until the soft parts seemed to be from two to three times their ordinary thickness. I incised the swelling to the depth of about an inch, but found no pus. The swelling went on with only moderate pain and slight fever for several days more when I again incised the swelling, this time passing the knife in past the zygomatic process until, at a depth of between two and three inches from the surface, the point struck the bone at the inner side of the temporal fossa. This cut evacuated about a drachm of non-foetid pus and the symptoms subsided as before. During the five years which followed he had two slight attacks of ear ache but by the prompt and vigorous use of hot water in the meatus his mother succeeded in checking the inflammation within a day or two, and since then, by scrupulous attention to the cleansing of the nasal passages and by taking large doses of aconite at the first sign of a cold, he has kept from having any further trouble for about five years; but I have no doubt that if he should allow another otitis media to get well started he would have a recurrence of the abscess in the temporal fossa.

Before finishing my remarks on this case I wish to state explicitly that at no time did the boy have any pain, tenderness, or swelling behind or above the ear.

Since my first introduction to this complication of middle ear disease, I have kept on the lookout for reports of similar cases in the literature, and have noted only the following:

1. Massier (*La Presse Oto-laryngologique Belge*, Jan., 1903, abst. in *Arch. f. Okrenheilk.*), reports two cases of abscess of the temporal fossa. One of these was of auricular origin.

2. Raoult (*Rev. hebd. laryngol.*, 1902, 42, abst. in *Arch. f. Ohrenheilk.*), reports a case of abscess of the temporal fossa in connection with chronic suppuration of the middle ear. A radical operation was performed but no disease of the mastoid was found; there was, however, a superficial necrosis of the anterior lower wall of the external meatus. The contents of the abscess were foetid.

3. Müller (*Fortsch. d. Med.* Aug. 1, 1904), reports case of Paul G., 19 years old; suppuration of the left middle ear after scarlatina; transient tenderness back of ear then swelling and slight fluctuation in front of ear. Incision found no pus till periostium of zygomatic process penetrated, then evacuation of 20 ccm. of thick pus; recovery.

4. Antonelli (*Rec. d'ophth.*, May, 1905.) Girl aet. eleven months. Had the grip followed by free discharge of pus from the right ear. Two days after discharge appeared, tissues in front of ear began to swell, the infiltration progressing steadily forward until the whole zygomatic region and the lids of that side were involved. Antonelli saw the child about two weeks later and found a pasty swelling extending from the ear to the outer commissure of the eye lids. No fluctuation nor pain. After another week, Antonelli saw the child again with increased swelling of the side of the face and of the tissues of the upper lid. Fluctuation distinct over the lachrymal gland. An incision along the margin of the orbit evacuated a caseous mass which Antonelli considered to be the remains of the lachrymal gland, with considerable thick greenish foetid pus. A sound passed along bare bone to the apex of the orbit. A drain was introduced and the symptoms gradually subsided, though at the time of Antonelli's report the swelling of the cheek was not entirely gone and the ear was still discharging. No mention is made of any mastoid symptoms. Antonelli thinks the infection passed from the middle ear either through the Glaserian fissure or the incompletely closed petro-tympanic suture; thence between external pterygoid and the temporal sheath to the pterygo-maxillary fossa; thence through the sphenomaxillary fissure to the orbit.

In attempting to explain this complication it may be that, in cases like the first one in my report, the suppuration has simply

spread from the mastoid cells into the cells in the root of the zygomatic process and then has broken through either on the outer surface of the process as in Müller's case, or into the temporal fossa. But where mastoid symptoms have been entirely wanting and especially where, as in my second case, the complication has recurred repeatedly, it seems more likely that the zygomatic cells are infected directly from the middle ear, the occurrence being favored by some natural defect in the tympanic wall. We should remember that the zygomatic and squamous cells are originally and perhaps always an entirely separate system from the ordinary mastoid cells, sometimes attaining such a development that Schwalbe, in his *Anatomie der Sinnesorgane*, speaks of the cavity in the root of the zygoma as the *Antrum squamosum*. So far as I know, no one has observed direct openings from the tympanum into the zygomatic cells, but Cholewa (*Deutsche med. Wchnschr.*, 49, 1888), in explaining the occurrence of abscesses above the temporal ridge, cites Zuckerkandle to the effect that out of 200 skulls, he found four with a direct opening from the posterior part of the tympanum into the lowest cells of the squamous portion of the bone; that is into cells which anatomically belong with the cells in the zygomatic root. It is possible also that incomplete closure of the petro-squamosal suture, as observed by Cholewa, may account for some of these cases.

With regard to the path taken by the pus or infection from the zygomatic root to the temporal fossa, most of the cuts which show cells depict quite a thick layer of compact bone between the cells and the fossa, but in a plate accompanying an article of Bezold's (*Arch. f. Ohrenheilk*, XIII, 1), a section of a temporal bone is shown in which one of the cells in the zygomatic root has only an exceedingly thin wall of bone to separate it from the fossa; and the infrequency with which the latter is involved is a strong indication that these zygomatic cells, on account of their separate anatomical origin are really but seldom involved in the infection of the real mastoid cells.

There is, of course, the possibility that the infection may have passed through the Glaserian fissure, and in Antonelli's case this or the incompletely closed petro-tympanic suture may quite possibly have been the route taken; but we should expect some marked interference with the action of the jaw if this had been the case with the other patients mentioned, and nothing of the sort was noticed in my cases nor in the others so far as I can determine.

Clinically, this complication is of comparatively benign significance. All the cases apparently have done well with no other treat-

ment than opening the abscess. In the therapeutics, the only point that I wish especially to urge is the necessity of sometimes going very deep in order to reach the abscess. We so seldom have to open abscesses in this region that, speaking from personal experience, I should say that there was a decided tendency for the aurist to get cold feet after having passed in the knife for an inch or so with no results. One can not help picturing the embarrassment which would be felt on cutting an artery at a depth of two or more inches from the surface; but as the last of my cases showed it is sometimes impossible to reach the pus without pushing the knife clear past the zygomatic process until it strikes the inner wall of the temporal fossa.

Adenoids. A. VINSONHALER, Little Rock, Ark. *Med. Herald*, February, 1903.

This paper discusses only the treatment of adenoids. Its author who has had experience in London hospitals, states that somnoform (a mixture of chloride and bromide of ethyl) has been by experience shown to be no better than chloride of ethyl, and not a bit safer. "Deaths are recorded against all of them." He holds the safest anæsthetic is the gas ether sequence.

The paper advocates the use of adenoid forceps; the curette is not mentioned. According to Mr. Hewitt, the London anæsthetist, the ideal position for removal of adenoids, is with the head turned to the right side, allowing blood to escape into the right cheek; but he adds that most operators cannot work when that position is used.

The reviewer, from long experience, has from the first found this position easy; and it is well known that Fletcher Ingals and others prefer it.

Mr. Hovell of London in every adenoid operation removes the posterior ends of the inferior turbinates, being led to do this by noticing a number of cases in which mouth breathing persisted after removal of the adenoids.

EATON.

ACUTE OTITIS MEDIA TREATED BY THE OPSONIC INDEX METHOD. BY INVITATION.*

BY A. C. MAGRUDER, M. D., AND GERALD B. WEBB, M. D.,
COLORADO SPRINGS.

DR. MAGRUDER:—Mr. P. Merchant, age 42, consulted me November 26th, 1906, complaining of pain in right ear which had existed for three days and was so intense as to prevent sleep. He had had slight gripe symptoms for about a week. Patient not tubercular and has an absolutely clean bill of health.

Duration, three days, slightly impaired hearing, intense pain, no vertigo, auricle normal, mastoid not involved. Examination showed inflammatory condition of drum head with bulging of the posterior inferior quadrant.

Diagnosis—Acute Otitis Media. Advised paracentesis; refused. Forty-eight hours later perforation in the posterior inferior quadrant took place, and an abundant serous discharge ensued, although perforation was small, 1 m.m. Pain did not cease with appearance of discharge but was less. Microscopic examination showed almost pure culture of pneumococci. Saw patient every day and took unusual precautions to prevent extraneous infection. Examination of throat and nose showed redness and swelling around tube and a diffuse hypertrophic rhinitis. Eustachian tube was very large and wide open; even slight blowing of the nose caused air to pass out through the ear. For this reason especial attention was directed toward keeping nose and throat in as nearly aseptic condition as possible to prevent reinfection from that source. As long as discharge remained serous the ear was wiped dry each day and powdered boracic acid insufflated. For two weeks, the discharge remained serous and then became yellow, thick, and stringy. The microscope showed no other infection than the original pneumococcus. On account of the stringy mucous appearing with the discharge, it was necessary to resort to irrigations to cleanse the ear. The perforation was enlarged to 3 m.m., and ear cleansed with warm boracic acid solution and twenty per cent Argyrol instilled.

This line of treatment was continued until December 24th, with no material decrease or increase of the discharge. During the time from December 10th to January 20th, I ran the entire gamut of

*Read by invitation before the Western Section of the American Laryngological, Rhinological and Otological Society, Denver, Colo., February 16, 1907.

treatment with Alphozone, Peroxide of Hydrogen, Argyrol, various astringents, etc., without any appreciable effect on discharge. Hearing was reduced to about one-half. Examination with probe revealed no denuded bone area and no bone dust found in sediment after washing. Microscope still showed pneumococcic infection only. The only thing I seemed able to do was to prevent other infection from complicating the case.

On January 20th, patient complained of intense headache over right temporal area extending over upper temporal ridge which directed my attention to, possibly, a circumscribed meningitis or brain abscess. Temperature normal and pulse seventy, as they had been through entire illness.

So far this case has presented nothing of unusual interest save my inability to stop the discharge; but during all this time it must be said that the patient, being a very busy man and keeping long hours in his store on account of the holiday season, did not quit his work and could not be kept quiet. He even made three short railroad trips to Cripple Creek, forty-five miles distant, during which time he was constantly engaged in matters pertaining to his business.

Patient had appointments in Chicago and New York which he must keep by February 1st, and in my despair, having heard Dr. Webb's lecture on the marked beneficial results obtained by Wright in these cases, I took the patient to Dr. Webb for opsonic treatment. This was January 20th, 1907, seven weeks after patient's first visit to me, and on the above date, I removed from the ear a specimen of the pus for Dr. Webb. His part of the work he will explain to you.

For two days subsequent to this visit to Doctor Webb, pain in right temporal region was very intense, and was controlled by ice bags and codein. Bowels were freely open with calomel and castor oil, and pain ceased. I concluded that the pain was not so much a part of the ear condition as it was an intestinal toxinemia.

January 23rd, I attempted to practice Baer's passive congestion treatment over ear, but failed on account of air passing in through Eustachian tube. Twenty per cent warm Argyrol solution was used in ear every day and a part of this passed into the throat.

January 24th, 3 p. m. Doctor Webb's treatment began. An hypodermic injection of fourteen million pneumococci.

January 25th. Discharge greater.

January 26th and 27th. Condition the same. Increased discharge.

January 28th. Discharge very much less and distinctly mucoid in appearance. Second injection of vaccine given today by Doctor Webb,—twenty million pneumococci.

January 29th. Ear nearly dry, no pus or mucus showing; only a slight amount of serum present. Ear wiped dry and boracic acid insufflated.

January 30th. The boracic acid insufflated the day before removed from ear in absolutely dry condition. This was wiped out and fresh powder insufflated.

February 1st. Dressings dry. Ear dry.

February 2nd. Patient left this morning for Chicago and the East.

CONCLUSIONS: *First*—An acute suppurative otitis media resisted treatment for sixty-one days.

Second—No mastoid involvement.

Third—Pneumococcic infection alone present.

Fourth—Six days from first injection of vaccine ear was absolutely free from pus and dry.

Fifth—While this opsonic work had been carried on for some time with marked success by Wright, in London, I am told by Doctor Webb that this is the first case of Suppurative Otitis Media so treated in Colorado, and it is his opinion that it is the first case so treated in the United States.

Sixth—If I do not improve my method of treatment in this class of patients Dr. Webb will get all of them away from me.

DR. WEBB.—Dr. Magruder's patient presented a condition of purulent discharge from the right ear, in which I found a pure culture of Fraenkel's pneumococcus. The patient stated that this discharge would soak six pieces of absorbent cotton daily. Complaint was also made of much headache the past few days. The discharge had lasted about 60 days. Cultures were taken in serum broth and plain agar. An excellent growth occurred with each.

January 21, 1907. Patient's opsonic index to this growth found to be .7.

January 24. Opsonic index again .7. Between these dates I had grown and standardized a vaccine according to Wright's methods, and an inoculation of 14 millions was now made.

January 28. Patient reported an increase of discharge for 24 hours after the inoculation. For two days following he had had

intense headache. Discharge has now almost disappeared. Inoculation of 20 million was made. Opsonic index on this day found to be 1.1.

January 30. Dr. Magruder reported to me that no trace of discharge remained.

It might be possible for inoculations to intensify headaches by increasing during the negative phase the inflammatory condition of the membranes of the middle ear. In this case, however, I do not think it responsible, because of the small size of the dose. Wright has shown that by using small doses the negative phase is largely avoided. The average dose of the pneumococcus is fifty (50) millions.

The pneumococcus will be found in the majority of middle ear inflammations following influenza, and Wright's methods have been eminently successful in effecting cures. The advantages of vaccines are exemplified in this case by increasing the patient's resistance, or opsonic index from .7 to 1.1 by the first dose. The second dose probably raised it still higher.

Since the communication of this report several similar cases have responded to the same method of treatment, resulting in complete cure. Dr. Magruder reports, ten months after above treatment, that there has been no return of the discharge.



Angiomatous Growth in a Case of Ozoena Originating During Pregnancy. STREIT. *Monat. fur. Ohrenheilkunde*, Aug. 1909.

In the beginning of her pregnancy a young woman, who was suffering from ozoena, noticed an increased secretion and gradually increasing obstruction on the right side. At about the fifth month, daily hemorrhages from this nostril began and continued until the end of pregnancy. After this the hemorrhages were less frequent, but more abundant. Examination showed the presence of a large red tumor, obstructing the entire right nostril. It proved to be an angiofibroma attached to the lower turbinated bone.

YANKAUER.

BLINDNESS DUE TO POST ETHMOIDAL EMPYEMA ACUTE. REPORT OF A CASE.

BY GREENFIELD SLUDER, MD., ST. LOUIS.

That blindness may be produced by disease of the post ethmoidal and sphenoidal sinuses, also of the Antrum of Highmore is well known. Onodi in a recent monograph "*Der Sehnerv und die Nebenhöhlen der Nase.*" (Alfred Holdr, Wien, 1907) has given the result of ten years' study of this subject and cited many cases, some with autopsy findings where the diseased process had extended to the optic nerve through necrosis of bone with meningitis, or through extension of infectious material by vascular channels with meningitis, and some producing blindness by pressure on the optic nerve. In Grafe's Archiv, 1907, Birsch-Hirschfeld cites additional cases. Posey and Paterson cite similar cases.

The optic nerve and chiasm lie above the post ethmoidal and sphenoidal sinuses with a layer of bone between, which is usually quite thin. Sometimes the post ethmoidal cells extend backward to the chiasm and lie above the sphenoidal cells so that this portion of the floor of the brain cavity is made by the post ethmoidal cells and not the sphenoidal cells. More often it is made by the sphenoidal cells which then extend forward to meet the post ethmoidal cells, they both being at the same height and each forming their part of the floor. The anatomy of the case I report must be of the first arrangement because the sphenoid was not involved. The blindness may have been from pressure, or toxins according to Birsch-Hirschfeld, or both. This case seems to me of interest because of its acuteness, its dire consequences and the brilliant result of treatment.

W. H., male, 20 years of age, well developed, healthy and strong, applied to Dr. Luedde about 6:30 p. m. July 22, 1907, saying that "Three days ago the present trouble began with a sharp pain in right eye. 12 hours later a slight swelling appeared around this eye which lasted 12 hours. The pain continued until today. This morning at 7:30 both eyes became blind. The left eye remained blind about 25 minutes. The right eye can see direction of motions of hand 3 feet, vision of left eye 15-19 by artificial light. Examination showed the right upper meatus of the nose swollen shut and pale (oedematous). No pus could be discovered. Effort

was made to shrink away the swelling which was only in small part successful. He was placed in St. Luke's Hospital and the effort repeated at midnight, unsuccessfully. It was repeated at 6 a. m. July 23, 1907, and followed by the discharge of about a teaspoonful of pus into the throat. Three hours later (9 a. m.) he reported to Dr. Luedde who found the vision, right eye 15-19, left eye 15-12. The discharge of pus continued intermittently, stopping in ten days. It always appeared between the middle and upper turbinates. Never did any appear in the recessus spheno-ethmoidalis. Four days from the beginning of the treatment the right upper meatus swelled shut again for a few hours (about six hours) the pain recurred to a slight degree and his vision in the right eye fell temporarily from 15-12 to 15-24 for this length of time. From the tenth day he remained normal in every way and continues so at present.

That the eye did not show changes in the fundus, Dr. Luedde thinks is explained by the central artery and vein of the retina not entering the optic nerve until about $\frac{1}{2}$ in. from the globe and that the pressure clamped the nerve posterior to this point, that is, in the optic canal. I agree with this idea. Had this case gone on it would probably later have shown atrophy, descending. That the left eye should have been blind for a short time is probably explained by toxins as suggested by Birsch-Hirschfeld in some of his cases. I am sorry that no examination of the pus was made.

3542 Washington Ave.

An Unusual Case of Scleroma of the Larynx. OTTO, MEYER.
Monatschr. f. Ohrenh., May, 1906.

In addition to a beginning ozoena, this patient, who lived in a locality where scleroma is prevalent, had a nodular tumor as large as a bean on the right false cord. The rest of the larynx was normal. The tumor was removed with the galvano-cautery snare. Microscopic examination showed all the typical histological appearances of scleroma.

YANKAUER.

INFECTED CHOLESTEATOMA INVOLVING THE LABYRINTH AND ACCOMPANIED BY TYPICAL NYSTAGMUS.*

GEO. H. MATHEWSON, B. A., M. D., MONTREAL, QUE., CAN.

My object in presenting this case to your notice is to draw your attention to the importance of Nystagmus as a factor in differentiating between Suppurative Labyrinthine Disease and Cerebellar Abscess, for I well know that to most of you cholesteatoma of the temporal bone is no new thing. For those whose work lies chiefly along routine medical and surgical lines it may be well to state that cholesteatoma is simply a mass of epithelial debris, arranged in more or less definitely defined concentric layers between which cholesterin crystals are frequently found. It occurs in persons who have at some time had suppurative otitis media, with a resultant permanent perforation of the membrana tympani through which perforation the epidermal tissue of the external meatus has invaded the tympanic cavity and there proliferated and collected, forming a mass which may completely fill this cavity and the attic and mastoid antrum and erode the surrounding bone. It is worth noting that a dry uncontaminated Cholesteatoma rarely causes any trouble.

While for many years nystagmus has been recognized as one of the symptoms both of suppuration of the labyrinth and of cerebellar abscess, it is only of late that we have been able—thanks to the work of Neumann, Barany and others—to use the symptom as a means of establishing a differential diagnosis between these two conditions. Dizziness, nausea, vomiting and deafness may and generally do occur in both diseases, and severe occipital headache, which is generally accepted as strongly indicative of cerebellar abscess, may (according to Neumann), occur also in labyrinthine disease if this be complicated by localized meningitis. The workers in Politzer's Clinic discovered that the mode of occurrence of nystagmus is very different in the two diseases, and that in it we have our best means of making a differentiation. If, in a patient who is suffering from suppurative disease of the middle ear, nystagmus develops when he is made to rotate his eyes toward the healthy ear, and does not appear when the eyes are rotated in the opposite direction, we can assume positively the existence of suppurative disease of

* Read before the meeting of the Canada Medical Association, Montreal, Sept. 14, 1907.

the labyrinth. If, on the other hand, nystagmus develops when the eyes are rotated toward the diseased ear, and does not appear when they are rotated in the opposite direction, we may safely diagnose the presence of cerebellar abscess.

In progressive disease of the labyrinth the nystagmus disappears and hence is not seen in advanced disease when the membranous labyrinth is destroyed. Then, too, since by far the larger number of cerebellar abscesses arise from direct extension of suppurative disease of the labyrinth (90 per cent according to Alexander), we may have both forms of nystagmus in the same case. (As illustrative of the first point, I remember seeing a case of advanced labyrinthine disease in Dr. Politzer's Clinic, in which there was neither dizziness nor Nystagmus).

The history of my case is as follows:

On April 7th, 1907, C. B., male, a clerk by occupation, was brought to me complaining of dizziness, vomiting and weakness; he was quite clear mentally, and stated that he had been perfectly well until 22 days previously, when he went for a bath, and after diving noticed quite a severe pain in the left ear, which had never given him any trouble before. He applied hot poultices to the ear and three days later some pus came away from it. The pain was severe at times, but he kept at work most of the time. On Friday morning, April, 5th, he noticed that he was dizzy and that the pain in the ear had disappeared. He went to work, but noticed that he frequently saw objects double. After his supper he had a severe attack of vomiting. He felt dizzy lying in bed, no matter what position he assumed. On Saturday, he remained at home and during that day had two attacks of vomiting. On Sunday morning, he vomited again and seemed so sick that he was advised to consult me, which he did.

When seen by me about eleven o'clock on Sunday morning, April 7th, i. e. two days after the onset of the dizziness, his condition was as follows:

He was a well nourished young man who looked very ill; his pulse was 66, and his temperature 97°—he had no pain, and his chief complaint was on account of the dizziness, which was so extreme that he was unable to walk alone, though with the help of a friend he could get along fairly well.

The right external auditory meatus was found to be of normal size. The drum membranè showed a small old perforation placed near the centre. Hearing normal on the right side. Examination

of the left meatus showed a great narrowing, due to a prolapse of the superior wall. Through this narrow opening I saw a wet reddish gray structure which I thought to be the lower part of the inflamed drum membrane, but which later proved to be the exposed face of the inflamed cholesteatoma. There was a small amount of pus in the meatus. There was no tenderness, redness nor swelling over the mastoid process. Tapping the cranium gave rise to no pain. There was absolute deafness on the left side.

On causing the patient to rotate his eyes to the left side there was no nystagmus, but when he was made to turn them to the right (or healthy side), there was a marked coarse nystagmus chiefly rotary. It was further noted that when the patient himself was rotated from his right to his left (being turned about rapidly three times), a marked rotary nystagmus was produced, while turning him in the opposite direction caused no Nystagmus.

The right fundus was normal, the left disc possibly somewhat blurred.

The patient was admitted to the General Hospital and I performed a radical mastoid operation the same afternoon. After the bone had been removed to a depth of about one-fourth of an inch, about 5i of creamy greenish fetid pus exuded, and it was then seen that the deeper part of the external meatus, the middle ear, and the mastoid were filled by a Cholesteatomatous mass. On removing this mass and the upper part of the posterior wall of the bony meatus, it was found that there was a carious opening in the bony labyrinth at a point about one-fourth of an inch above the fenestra ovale. The softened bone about this opening was gently curetted away. It was also seen that there was a carious opening about the size of a five cent piece in the roof of the antrum and attic, through which the dura could be seen. After curetting the walls of the tympanic orifice of the Eustachian tube to ensure the obliteration of that opening the membranous meatus was split longitudinally and the flaps forced against the walls of the bony cavity and held there by iodoform gauze and rubber drain, and the original skin incision behind the auricle completely sutured up. About a week later that part of the cavity not covered by the integumentary flaps was covered by skin grafts, and by the middle of June complete epidermisation of the cavity had taken place. It is interesting to note that immediately after the operation the dizziness was found to have disappeared.

56 Crescent St.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

CONJOINED SECTIONS ON LARYNGOLOGY AND OTOTOLOGY.

Meeting, May 29, 1907.

THOS. J. HARRIS, M.D., CHAIRMAN SECTION ON LARYNGOLOGY.

WENDELL C. PHILLIPS, M.D., CHAIRMAN SECTION ON OTOTOLOGY.

WENDELL C. PHILLIPS, M.D., PRESIDING.

Meningitis as an Intra-Cranial Complication in Diseases of the Accessory Sinuses. By L. A. COFFIN, M. D.

Meningitis as an Intra-Cranial Complication in Diseases of the Middle Ear. By ARNOLD KNAPP, M. D.

Statistics have shown that the meninges are first infected in nearly three-fourths of the cases in the posterior cranial fossa and in slightly over one-fourth of the cases in the middle cranial fossa. This is of importance in considering the possibility of operative treatment.

Forms of meningitis: Aside from serous meningitis, the classification of purulent meningitis into encapsulated, acute, progressive, and general, as suggested by Heine is the most satisfactory one.

Symptoms: Kernig's sign is the most constant. The value of lumbar puncture in diagnosis is discussed.

Prognosis: Less unfavorable than previously thought. Report of successfully operated-upon cases. Progress in the general variety of purulent meningitis however is absolutely bad.

Operative treatment: Broad exposure of the infected meningeal area if accessible, incision, drainage by introducing gauze tampons in the sub-dural space.

As in general surgery advances in the treatment of peritonitis is due to the more thorough elimination of the primary focus, so in otitic meningitis our aim should be to better eradicate the primary focus in the temporal bone and that means in many cases the early recognition and proper surgical treatment of the labyrinthine sup-puration.

—Author's Abstract.

DISCUSSION.

PROF. G. KILLIAN, Freiburg, opening the discussion. Gentlemen.—Your esteemed president has asked me to open the discussion on Dr. Coffin's paper. I comply with pleasure, as I have had considerable experience with the complications following inflammation of the accessory sinuses of the nose. Aside from the three cases mentioned by Dr. Coffin which took a fatal turn after the frontal sinus operation, I have observed six other cases where the complications attending empyema of the accessory nasal sinuses were already well developed at the time when I was called to see the patients. The theoretical aspect of this question has engaged my mind for some time, especially in its anatomical relation. The results of my studies you will find in part in my atlas "The Accessory Sinuses of the Nose and their local relations to the surrounding organs." They have also been discussed and demonstrated on the occasions of the meetings of the Association of South-German Laryngologists in Heidelberg. I have arranged the respective paragraph in Paul Heymann's Manual of Laryngology and Rhinology, and have since then carefully followed up our literature on this subject.

It will be best, perhaps, to describe briefly those cases which have come under my observation.

Case 1. The patient suffered from chronic empyema of the frontal sinus on the left side, developed after a trauma received some months before. This case is described more in detail in my article on "Killian's radical operations of chronic frontal sinus empyema" in the *Archiv für Laryngologie*. Symptoms of acute inflammation developed in addition to the empyema of long standing. The facial expression was strangely altered, the walk reeling and uncertain, the pulse greatly retarded. On radical operation, I found the mucosa of the frontal sinus thickly covered with masses of fibrin which also permeated the mucous membrane. As the brain seemed to be involved, I removed the posterior wall of the frontal cavity and exposed the dura. It was sound, so that there seemed to be no indication for puncture of the frontal lobe for the present. In the course of a few days all symptoms of brain affection abated, and I reached the conclusion that it had been a case of slight serous meningitis. If I am correct, another such case has lately been recorded. As is well known, serous meningitis has often been noticed as a sequela of empyema of the middle ear. I take the liberty to mention, on this occasion, that the first recorded case of this nature

(Levy, *Zeitschrift für Ohrenheilkunde*, XXVI, 1894), was observed by me.

Cases 2 and 3. In two cases, I have observed suppurative meningitis directly following my radical operation of the frontal and ethmoid sinuses. In both cases, the operation had been successfully conducted without any mishap, and the wound showed every tendency toward healing by first intention. In spite of this, suppurative meningitis developed, resulting in death in the course of a few days. Autopsy showed that in Case 2 the wound was free from all infection. A portion of the middle turbinate in the region of the olfactory fissure, its lower edge situated at a distance of more than 1 cm. from the lamina cribrosa, showed a small trace of pus, and from this point a thin line of pus could be followed along the middle turbinate up toward the lamina cribrosa. This line of pus could be traced to the dura mater which showed signs of suppurative inflammation in small area and had caused the meningitis.

It was, then, a case of infection of a small area on the lower edge of the middle turbinate. How this infection developed is difficult to determine. The maxillary sinus had not yet been operated upon and contained very offensive pus. We had intended to perform this operation in a subsequent session. Two cotton tampons, which I had introduced prior to the operation and allowed to remain in place one day, had come in contact with the middle turbinate; and it is likely that the infectious pus from the maxillary sinus had been brought into close proximity to the point on the middle turbinate, thus causing infection.

In Case 3, which I operated shortly before my departure for the United States, I encountered empyema of the frontal, ethmoidal and maxillary sinuses on the left side, of fifteen years' duration. Polypi had also formed. The maxillary cavity was tapped from the mouth and syringed regularly, and the polypi removed. The patient (female) bled profusely even on slight provocation; therefore, when all acute symptoms of inflammation in the nose had disappeared, I operated only on the frontal cavity and the ethmoid bone, and found both much diseased. The posterior ethmoid cells were sound, so that I did not see any indication for the opening of the sphenoid cavity. Unfortunately this cavity was not carefully examined prior to the operation. For the first two days after the operation the patient suffered only slightly from headache and showed at times a slight increase in temperature; then meningitic symptoms developed suddenly, and the patient died two days later.

Post mortem section proved the wound entirely free from infection as in the other case. The very roomy sphenoid cavity showed chronic thickening of the mucous membrane and contained a glassy mucus. Only in its most posterior angle, directly below the sella turcica, did we find a small amount of pus. The suppurative inflammation continued from this point of the mucous membrane through the bone along the posterior side of the hypophysis to the inner layer of the dura mater. In this way meningitis had developed, and in spite of its short duration there had been a very marked discharge of a cloudy liquid. The liquor cerebro-spinalis being in abundance and under high pressure, had likewise clouded after only twenty-four hours, as was shown by lumbar puncture. This case is very difficult to account for. As the maxillary cavity contained pus notwithstanding its irrigation, it is possible that on account of the position of the patient on her back particles of this pus had settled backward and downward, thus causing fresh infection of the chronically inflamed sphenoid cavity. It is to be assumed that the virulence of the bacteria present in this case had been greatly augmented on account of the different previous operative interventions and especially the frontal sinus operation itself. There is a possibility in this case that these changes had already begun to take place previous to the operation. It is a fact that toward the last the patient had complained of pains in the parietal and occipital regions, which must be attributed to the infection of the sphenoid cavity.

Case 4 presents the favorable termination of an abscess of the frontal lobe following empyema of the frontal sinus. This case occurred nearly nine years ago, but it has been reported in detail only in the Freiburger Association of Physicians. I had prepared a detailed description, but the manuscript was never completed because I was turned aside by bronchoscopy and other things. A number of analogous cases has been reported in recent literature, but by far the most of these died in spite of the operation. My patient was the second case where timely operative intervention brought about a cure. The first case is published by Denker in the *Archiv für Laryngologie*. Since then others have been recorded.

This was a case of frontal lobe abscess on the right side with extraordinarily typical forms of sclerosis. The indirect effect upon the inner capsule had caused hemiplegia of the left side. The patient was in a condition of complete coma and had Cheyne-Stokes' breathing when placed on the operating table. The posterior wall

of the frontal cavity was not perforated. When I removed this wall, I noticed a few drops of extra-dural pus. The inner upper area of the dura was covered with granulations of the size of a five-cent piece, and the center was perforated. When I increased the opening from this point, a large quantity of thick pus escaped from the frontal lobe. It seemed unaccountable that so large an amount of pus had been in the frontal lobe without causing perforation into the ventricle. The patient showed signs of improvement while yet on the operating table, and within eight weeks the brain abscess and external wound were healed. The most rigid examination and observation extending over a number of years failed to disclose the least psychic defect. The patient died seven years later of carcinoma of the liver. To my surprise, post mortem section revealed a cicatrix which affected only the extreme upper surface of the right frontal lobe where it had grown together with the wound. The volume of the lobe was the same as on the other side, so that I am constrained to assume that in this case only a small portion of the brain had undergone deterioration and that nearly all of the pus had collected by exudation.

Three other cases are characterized by general sepsis following extensive empyema of the accessory sinuses.

In Case 5, the accessory cavities had been diseased for years. High temperature, protrusion of the eyeballs, and acute hemorrhagic nephritis developed after intranasal operation. This was the patient's condition when I first saw her. Curettage of the frontal, ethmoid and sphenoid sinuses on both sides brought about no change. The patient died two days later.

Case 6 is analogous with the exception that influenza was added to a chronic infection of the accessory sinuses. Here, also, exophthalmos and hemorrhagic nephritis were evident. The patient was not operated upon, only treated with anti-streptococcic serum, and died likewise after a few days.

Case 7 seemed to me to have suffered from acute or subacute pansinusitis. High temperature and septic phenomena had developed. The patient was in the tenth month of pregnancy, and was delivered by means of instruments in the obstetrical clinic. Here, also, death ensued after a few days.

In Cases 5 and 6 we are justified, I think, in assuming a thrombosis in the sinus cavernosus which brought about the condition of general sepsis. Case 7 may have had a similar development.

Cases 8 and 9 were furnished by two patients with acute and sub-acute periostitis and osteomyelitis respectively, starting from the infected frontal sinus. In case 8 the patient suffered for years from empyema of the accessory sinuses and had sustained a fracture in the diseased frontal sinus region. The osteomyelitis was already in progress when she came under my observation. Notwithstanding several operations we were unable to check its course. The entire frontal bone rapidly became necrotic and meningitis was followed by death.

Case 9 could not be saved although four operations were performed. Almost the entire frontal bone had been resected, and in this way the process of infection in the frontal region had been checked, but it continued along the base of the skull toward the temporal fossa, penetrated the dura, reached the temporal lobe and caused an abscess which discharged into the ventricle, causing death. The patient had suffered from suppurative pansinusitis for ten years. Periostitis and osteomyelitis had developed after my frontal sinus operation, in the region of the most anterior and interior angle of the wound on the remaining portion of the processus frontalis of the upper maxilla. At this point, the virulent pus had settled between mucous membrane and epidermis. The infectious process developed slowly, the patient seemingly getting along well in the first few days.

This brief account of cases shows that disease of the nasal accessory sinuses may be followed by the same complications involving the brain as empyema of the middle ear. It cannot be doubted, however, that these complications as sequelae of empyema of the accessory nasal sinuses are much more rare. Still it must not be left out of consideration that patients may have died from meningitis of nasal origin when it had not been possible to determine this definitely.

Dr. Coffin has emphasized correctly that the manner in which infection travels from an accessory sinus to the brain has yet to be studied. I can furnish a small contribution to the anatomical side of this question. In the first place, I have studied very carefully the course of the blood-vessels and especially the veins in the mucous membrane of the accessory nasal sinuses, in the bone, and in the adjoining dura mater, with reference to the periosteum. We succeeded in obtaining an excellent injection preparation which gave me the desired information. I have had drawings made of these preparations by our University drawing master, and demonstrated them a few years ago, in Heidelberg, but a detailed account

of this subject has not yet been completed. The results of my investigations were as follows:

In the mucous membrane of every accessory sinus we find a fine network of veins. These vessels are of largest caliber in the periosteal portion of the mucous membrane. The descending veins proceed for the most part through the mouth of the accessory cavity. However, the veins of the mucous membrane are in many places closely united with the veins of the bone and are continuous with them. In the bone we find a separate network of vessels. This can best be observed in thin bony plates as, for example, in the region of the lamina papyracea or in the walls between the cells of the ethmoid bone. If the bone is examined with a magnifying glass against the light, this fine network of vessels in its interior can plainly be seen. In the same manner as this network in the bone is connected with the mucous membrane of the accessory sinuses, it is also connected in many places with the veins of the dura mater or with the veins of the periosteum of the orbit or the periosteum of the entire nasal frame. In this way passages for the blood are everywhere provided, leading from the mucous membrane of the accessory sinuses through the medium of the veins in the bones to the periosteum on the other side to the dura. These passage ways are in many places long, complicated, fine, in other places they are short and wide. Sometimes there is a direct transition of a blood-passage from the mucous membrane of the accessory sinus to the dura mater. I consider these conditions exceedingly important, for they show that an extension of the inflammatory process from the accessory sinus mucosa to the dura is everywhere possible. The bone does not form an absolute barrier between the two. It restricts the relations of the blood vessels, but does not abolish them, just as a mountain range does not sever the connection between two countries, there being many mountain passes to establish communication.

I have not made a special study of the lymph passages. However, serial section made through the walls of an accessory sinus connected with the mucous membrane and the adjacent periosteum have shown that the bone is traversed only by blood vessels. It is to be assumed that the lymph passages take for the most part a like course with the blood vessels. Only in the region of the olfactory mucous membrane do we find broad lymph-sheaths which surround the branches of the olfactory nerve, and, as is well known, are directly connected with the arachnoidal space.

From a pathologico-anatomical point of view I would like to emphasize that septic processes are very often transmitted through the veins. Thrombosis takes place in them, bacteria lodge in the thrombi, these break up, and the process spreads in the vessels, leading to local and general complications. In considering the extent of inflammation from the mucous membrane of the accessory sinuses we must assume that such thrombo-phlebitic processes take place in the above described fine network of veins. The breaking-down of a single minute vein in the mucous membrane is sufficient to pass on the inflammation from this small area through the bone which in many places is very thin, into the corresponding vein of the dura. According to the intensity of this process will be its effect upon the cranium. If the inflammation takes a rapid course, then the liquor cerebro-spinalis is soon infected from the diseased dura and meningitis develops. If, however, the inflammation is less intense, if the dura, though diseased, does not permit the passage of the bacteria, then the dura, in the process of inflammation, comes in contact with the cortex and attaches itself to it, secondary relations between the vessels are formed in the inflammatory region, the pus-producing bacteria enter the brain substance and cause a brain abscess.

If the inflamed, diseased dura forms only the outer layer of a cerebral sinus as, for example, the sinus cavernosus, then a septic thrombus may form in the sinus which can easily lead to general sepsis or to meningitis.

Osteomyelitis holds an intermediate position. Here the infection progresses from the diseased accessory sinus at first only in the bone itself, and the process is chiefly confined to the diploe. Mostly, however, the secondary effects lead to the infection of the dura with the corresponding complications. In the case I have cited above, osteomyelitis began at the point where the bone was fractured.

These processes are to be explained in the first place by the action of the bacteria. Streptococci are generally found, but also staphylococci, pneumococci and others. As a rule these bacteria are of the same kind as those that have been lodging in the nose and its suppurating accessory sinuses for some time past, and we must assume that the patient had become used to the poisons produced by these bacteria, that is, there was a sufficient amount of anti-poison in the system. The patient was immune. This is probably the only reason why the inflammation had not reached the brain

in previous years. In simple inflammatory processes no bacteria are found with the microscope in the mucous membrane of the accessory sinus. If we assume that for any reason, a trauma (intranasal operation), a cold, a new infection, perhaps with a different kind of bacteria (influenza) the virulence of the bacteria already present has been greatly increased, or that more virulent germs have been introduced, then we can easily comprehend that a chronically inflamed mucous membrane is exposed to severe injury, especially as there are at first no corresponding anti-sera in the blood. If at any one place there is a greater degree of inflammation, it develops into direct necrosis of the tissues or into deterioration after previous permeation with fibrin. Any one or more minute veins in the mucous membrane at such a place transmits the disease with results such as we have just described. Whether this process develops rapidly or slowly is determined by the greater or less virulence of the bacteria.

We will, then, make some progress in this question only when we are enabled to extend our investigation not only to the kinds of bacteria that produce inflammation, but also to the degree of their virulence.

At present we have no adequate means of determining the virulence of streptococci. The results obtained with animals are not necessarily the same with men. However, the experiments so far made seem to indicate that there is a very great variation in the degree of virulence of streptococci in inflammations of the accessory nasal sinuses, and that even in inflammation accompanied by caries the virulence is considerably higher than in simple accessory nasal sinus empyema.

Time will not allow a more extensive discussion of the diagnostic side of these complications. For their therapy we are prepared by our experience in otology, for they are much more frequent in affections of the middle ear. Meningitis following accessory sinus operations takes so rapid a course that therapeutic measures are of no avail, not even Bier's treatment. Brain abscesses are often diagnosed too late.

In general sepsis, injections with anti-streptococcic serum may be attempted. In acute osteomyelitis and periostitis early radical measures are often successful. Luc has cured such a case. Perhaps Bier's treatment would be of value.

Chronic empyema of the accessory sinuses should be operated upon in time, so as to prevent complications.

It is to be hoped that we will learn how to avoid such complications more and more. In the first place, there are the fatal consequences which result from a blunder of the operator. These must become rarer and rarer with increasing practice.

My clinical experience teaches me that it is a good plan to operate upon an infected maxillary sinus before attempting the frontal sinus operation to prevent subsequent infection.

In distinctly acute cases radical operation is not advisable; but if operative intervention is necessary, only the chisel should be used.

Also in acute exacerbations of chronic empyema of the frontal sinus it is better to wait with radical operation, if this can be done, until the acute symptoms have abated. If the operation must be performed, the wound should not be closed primarily, but at the earliest on the third day.

Since intra-nasal operations, especially in rapid succession, are likely to cause acute inflammation of the nasal mucous membrane and, therefore, to augment considerably the virulence of the existing bacteria, it is advisable to wait with radical operation until all signs of acute irritation have disappeared.

DR. GRUENING said that Dr. Knapp was in favor of early and complete operation, and in favor of operating even in the most desperate cases, for good results are often obtained even then. He agreed with Dr. Knapp fully on these points. He had with him a report from Mt. Sinai Hospital, taken from the last book covering a record of about fifteen months' work, showing 122 cases of mastoid disease operated upon during that time. There were only three cases of meningitis in all these; five cases of abscess of the brain (three of the temporo-sphenoidal lobe, and two of the cerebellum); and fourteen cases of thrombosis of the lateral sinus. There were fifteen deaths. If one remembers that the patients who come to Mt. Sinai Hospital are poor and neglected, and often arrive in a desperate condition, this mortality is really very small. When the diagnosis has been made, the patient is generally operated upon immediately. If lumbar puncture is required, the puncture is made when the patient is on the table, also the examination of the blood when needed, so that the lumbar puncture, the blood examination, and the operation are all performed at the same time if necessary.

There were more than three cases of meningitis. Why are only three so reported? Because they were so entered when they came into the hospital. If the condition of the patient is given by the most important symptom, then meningitis is the more dangerous

condition, for we can cure brain abscess more often than we can cure a general meningitis. Moreover, these cases of general meningitis are not only meningitis but are accompanied with general infection. In one instance, the meningitis was complicated by streptococcaemia, in another with pneumococcaemia; and one has to consider whether the meningitis is secondary to the streptococcaemia or vice versa.

Dr. Knapp had not spoken of the ophthalmoscopic finding in meningitis. This is not important, and he did well not to mention it. He had published an account of a case of serous meningitis in which there was an optic neuritis. As regards the prognosis, it is immaterial whether or not that complication is present.

One condition which Dr. Gruening first observed many years ago is very interesting, i. e. mastoid disease complicated with herpes zoster in the course of the trigeminus. He told of a woman who had applied for treatment for otitis media. She had a very bad headache, high fever, and involvement of the second branch of the trigeminal nerve. He saw this case in consultation, and the patient died of meningitis. Later, he saw a second case of the same nature in Mt. Sinai Hospital, though he did not then connect the mastoid disease with the meningitis. This patient also died. Then he had a third case, and recalling these two which had been complicated with herpes, he said to his assistants that this patient would probably die. He thought that he had to deal with a meningitis, and that because the Gasserian ganglion was affected it was possible that the disease had already extended through the petrous portion—that there was probably a petrous bone with large air cells, and that probably the process had extended to the apex of the petrous portion, affecting the Gasserian ganglion, and thence had gone over to the dura, resulting in a meningitis. The patient died later of the meningitis, but unfortunately the Gasserian ganglion was not removed for examination. Dr. Gruening said that he had had five cases which presented this picture. In Dr. McEwen's book a fatal case of mastoid disease complicated with Herpes is reported. Dr. Gruening said that recently a report appeared from Dr. Brieger's clinic in Breslau containing similar observations. He thought that in this case the disease extended forward into the petrous portion, which was probably pneumatic instead of petrous.

DR. ZABRISKIE said, in connection with the papers read tonight, he had had occasion to look up the records of the Manhattan Eye, Ear and Throat Hospital in regard to the relative frequency of

suppurative meningitis and brain abscess, and that for the past four years he had made autopsies on eleven cases, nine of which were meningitis and two abscess, but that these figures were of little value because they were so low. The question which had interested him most had been the factor which determined a brain abscess or meningitis in these cases of accessory sinus disease, and also the very interesting anatomical relation in regard to the lymphatics between the upper air passages, i. e., the nasal membrane, the mucous membranes lining the sinuses, in their relation to the dura. The only knowledge we have on the subject is the comparatively recent experimental work which was done by Cuneo and his students, and they have been able to show—how definitely, remains to be seen later—that the only direct lymphatic connection is between the dura and the olfactory bulb. They have shown fairly conclusively that the lymphatics of the dura are quite distinct from the sub-arachnoidal space following the sheaths of the nerves. That there is some lymphatic connection between the accessory sinuses and the dura, seems to be beyond doubt, but it still remains to be demonstrated. It is also a very interesting fact that we can have such a large proportion of sinus disease with relatively so few cases of meningitis, unless we consider another besides the direct continuity or exposure of the lymphatic or vascular layers to the infection. That factor, of course, must be the same as that which determines all infective processes.

Another most interesting question is the pathogenesis of brain abscess. Meningitis is, of course, easy enough to understand when we consider the vast lymphatic connections just spoken of, but brain abscess is another matter. Here we have an infective agent which experience has taught us practically always forms in that part of the brain nearest to the suppurating sinuses. Of course there is a certain proportion of cases where we have a direct continuity leading from the dura to the pia by means of adhesions, but there is also a certain number of cases in which this adhesion cannot be demonstrated, at least we have in our laboratory been unable to find it, and we are forced to either admit the almost impossible feat of the infective material passing directly through the cerebro-spinal fluid and lodging in the brain, or else we must search for an abnormal bridge by which the infective material can travel across the subarachnoid space, such as a small vessel. These vessels do occur abnormally, as we have demonstrated in the laboratory, but their relative frequency is yet to be determined.

DR. MYLES said that it had always been to him a mooted question how and why meningitis occurs. He had had thousands of operative cases of disease of the ethmoids and sphenoids, but had never yet had serious brain complications or brain symptoms directly associated, with the operative procedures. He had one case where he was about to operate on the frontal sinus—a man who had been under observation for some years previously, and upon whom he had often urged the necessity for operation. He appeared after a year's absence and consented to have the operation performed if he could be allowed a week's time in which to arrange his affairs. This was allowed, and later, before the time set for the operation, he received word that the man had died of meningitis. He had also had another case in which he had not operated. In an interesting case of grip, he operated upon an abscess on the inferior turbinal which had extended along the bone of the nose and out on the outside of the antrum. This was cut and the wound drained and packed. The wound healed, although the patient was more or less comatose for several weeks at that time. The general physician said that it was a meningeal disease, but there was no evidence of pus in the cells and the patient apparently recovered. About a year afterward he died of brain complications.

He claims that the phagocytic wall is the greatest barrier to meningitis in accessory sinus cases where the brain plates are disintegrating, and when this wall is disturbed it causes lymphatic absorption, or venous thrombosis, or some other means of transmitting the septic conditions to the meningeal cavity. Dr. Myles said that he always showed a great deal of respect for the meningeal membrane that passes down with the olfactory nerve, and attributes his freedom from fatalities to not disturbing that part of the ethmoid. In other words, he cuts off the middle turbinal, and always leaves the median wall of the ethmoid, especially in frontal sinus complications as he believes that thrombotic absorption or direct infection is probably the cause of some of the brain complications. In every operation that he has performed in this region he had always feared that death might ensue, but so far it has not occurred. He was always fearful of it, however, and always respected that part of the cribriform plate and crista galli region.

DR. DENCH said that about ten years ago he reported a case of otitic meningitis, in which he drained the subdural space over the tegmen tympani. The patient made a perfect recovery. Although he had operated on a number of cases of meningitis since this time all the others had terminated fatally. In the latter cases not only

had the subdural space been drained, but ventricular drainage had been employed in some cases supplementary to lumbar puncture. Aside from the first cases mentioned, all these cases had proved fatal. It was important to remember that, in these cases, infection usually occurs through the posterior aspect of the petrous pyramid, either through the aquaeductus vestibuli or the aquaeductus cochleae, or the infection may travel along the sheath of the auditory nerve. In the successful case mentioned by Dr. Dench, infection had taken place through the roof either of the antrum or tympanum, and had infected the meninges in the middle cranial fossa. From the success reported in decompressive operations for the relief of brain tumor, Dr. Dench was inclined to think a similar plan might be tried, with success, in cases of otitic meningitis. He was inclined to believe that the pressure would be best relieved by removing a large area of bone over the cerebellar fossa, incising the dura by a crucial incision, and then packing off the subdural space. In this way, the pressure symptoms would be relieved, and, at the same time, the subdural space would be drained. In the presence of any localized area of caries, indicating the route of infection, he was inclined to think that a decompressive operation would be more successful if the subdural space were drained below the tentorium rather than above it. If, however, a carious area was found at the time of the radical or mastoid operation, naturally this should be followed, and the dura exposed at the seat of the infection. Remembering that infections usually occur along the posterior aspect of the pyramid, particular attention should be paid to the condition of the bone in front of the lateral sinus, and any carious area found here, carefully followed. Ventricular drainage might be indicated in certain cases, but, at the present time, he believed that the simple decompressive operation, with incision of the dura and light packing of the subdural space along the incisions, should be the first step of the procedure. Ventricular drainage might be performed later, if necessary.

DR. COAKLEY said that Dr. Coffin's paper directing attention to meningitis of nasal origin was most interesting. He thought that more cases of meningitis arise from purulent conditions of the nose than have heretofore been credited to that cause. Many children die of meningitis, and if these cases were examined at autopsy the point of infection would often be found to be from the nose or nasopharynx. Those men who are treating children realize that condition today as they did not a few years ago. He wished that Dr. Coffin had been able to arrange his cases so as to determine the

proportion of meningitis arising from intra-nasal operation as against the radical method, but that was probably impossible as yet.

Dr. Coakley himself felt that a rather complete external operation is much to be preferred to the intranasal operation. The latter is much more dangerous, especially in the frontal sinuses. Professor Killian's remarks would apply more particularly to intranasal operations followed by an external operation. That is because there is in many chronic cases a bacterium whose virulence is slight. He had met this difficulty in some experiments he had conducted this past winter. Streptococci taken from long-standing disease of the accessory cavities could not be made to grow on any ordinary media except blood agar; they could then be transferred to a second medium and would grow well. The intranasal work increases the virulence and quantity of these bacteria, and then if an external operation is performed one is much more liable to get infection. He had always previously considered it advantageous to do considerable intranasal work, and if that did not relieve the patient, to proceed with an external operation. All have had a certain number of septic cases result from the external operation.

Another point upon which Dr. Coffin had touched was that it makes considerable difference who does these operations. Many deaths follow sinus operations that are never reported, and there are good reasons why—the proper care was not observed. If these cases could be added to those reported by Dr. Coffin, the number of fatalities would be greatly increased. In many instances it was not the fault of the operator, but of his assistants. When working in the region of the ethmoid plate any undue force in sponging by the assistant can very easily perforate it. A trained assistant is as necessary as a trained operator.

Another point is the method of operating. In operating by the external route, in removing the ethmoidal cell labyrinth, if the instruments are not sharp enough the operator is liable to pull on the fibres of the olfactory nerve. Such traumatism is very dangerous. Sharp instruments should be used to cut off these fibres, so as not to endanger infecting the perineural lymph channels extending through the cribriform plate.

DR. COFFIN, in closing the discussion, thanked the gentlemen who had discussed his paper. With Dr. Coakley, he felt that the more he studied these cases in regard to intranasal work previous to radical operation, the more he was inclined to believe that we ought to do no intranasal work previous to the radical operation. If we adhere to this rule, we shall have less trouble.

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ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding
that they are contributed exclusively to THE LARYNGOSCOPE.)

TUBERCULOSIS OF THE MOUTH.*

BY ROBERT LEVY, M.D., DENVER, COLO.

Tuberculous lesions of the mouth include those involving the lips, cheeks, gums, hard palate, soft palate, tongue, teeth and alveolar process. Tuberculosis of the pharynx is not included in this paper, although it is difficult to draw the dividing line. So large a subject as tuberculosis of the tonsils forms a sub-division of pharyngeal tuberculosis and is also omitted from this discussion, although it will be necessary for purposes of comparison and illustration to touch upon all lesions of tubercular character ordinarily seen by what is known as pharyngoscopy. It is comparatively rare to see isolated lesions involving but one of the structures included in the mouth, and it is the author's belief that such rare cases form a class by themselves, possessing the same general characteristics that other tuberculosis lesions of the upper air passages do, but marking a distinct difference in course and prognosis.

A careful review of over 200 references, abstracts of which will appear in a subsequent paper, impresses one with the rather large number of tuberculous lesions of the mouth which have, from the time of Thomae's article,¹ 1839, been reported. The largest number, however, have appeared within comparatively recent years and I wish to mention especially the early articles of Bosworth,² DeBlois,³ Delavan.⁴ Yet when one analyzes the extensive literature, he must be struck by the general inaccuracy in diagnosis and the lack of appreciation of district variations and differences in these lesions; differences which are of special importance in etiology and prognosis.

* Read before the Thirteenth Annual Meeting of the American Laryngological, Rhinological and Otological Society, New York City, May 30, 31, and June 1, 1907.

FORMS.

Tuberculous lesions may manifest themselves in different forms, i. e., according to pathologic changes, according to mode of development and according to their clinical course.

First; the various pathologic alterations seen are nodular infiltration, superficial ulceration, deep ulceration, perforating ulceration, necrosis of bone, chronic abscess and tumor.

Second; according to the mode of development, we have two forms, "endogenous" and "ectogenous" (Grünwald),⁵ which corresponds to the general classification of Holländer⁶ into "descending" and "ascending."

Third; according to clinical course, we may have "malignant" and "benign."

Clinical observation confirms this classification. The "extogenous" or "ascending" form, that which may be designated as the inoculation variety or purely local, represents the less active, sluggish or "benign" type, while the "endogenous" or "descending" variety, that which represents infection through blood and lymph streams, through miliary deposits or infection from within, corresponds to the more active, virulent, malignant type.

ETIOLOGY.

It is a well established fact that tuberculosis of the upper air passages, and particularly of the mouth and pharynx, is more commonly found in males than females. This leads to the question of how far local irritation of the mouth and possibly slight injury of the mucous membrane enter into causation of tuberculosis. This also raises the question as to the existence of primary tuberculosis of these structures. There are innumerable cases upon record in which the only demonstrable lesion is that localized in the mouth and especially upon the tongue. In these cases, the history of ulceration following a slight injury to the mucous membrane, which although nothing more than an abrasion to begin with, refused to heal, should be fairly conclusive proof that the abraded surface was an easy portal of infection in which tubercle bacilli became lodged, the characteristic tubercular process following. On the other hand, assuming that there is a necessary vulnerability without which tubercle bacilli may be innocuous, leads to the belief that there already exists in individuals developing such a localized tuberculosis, another and primary focus of infection. Auguy,⁷ 1895, and others since then have stated that the most frequent mode of infection is through the blood current. Walsham⁸ has shown the

importance of the lymphatic system in the development of tuberculosis especially with regard to the frequency with which infection may be conveyed to the bronchial glands from above, through the adenoid tissue in the throat, including the pharyngeal and faucial tonsils. It has been unquestionably demonstrated that tuberculous infection may invade the system through the tonsils without producing any alteration in the tonsils themselves. It has also been shown by Cook⁹ that the teeth, especially when diseased, form excellent foci through which infection may be carried to the adjacent lymphatic structures. The question, therefore, becomes an extremely complicated one, especially when we remember that post mortem examinations have revealed the presence of foci of tuberculosis in the lungs which were not suspected and could not have been demonstrated ante mortem. It seems reasonable to conclude that, although local or systemic causes exist, infection may descend through the lymphatic system to the bronchial glands, invade surrounding structures and be carried by the blood current to such parts as the tongue, the lips, the gums or the hard palate, and that additional local irritation or trauma, however slight, may determine the outward manifestation of tuberculosis in these regions. Ragged, sharp or decayed teeth, extraction of teeth, poorly fitting dentures, biting the tongue, injury from pins or other sharp bodies in the mouth constitute the more common local cause. In fact, when we consider that the mucous membrane of the mouth, although more or less constantly bathed in tubercle bacilli laden sputum in tuberculous individuals, develops tuberculous lesions but rarely, one must admit that there exists a special protective agency. This protective agency obtains so long as the surface of the mucous membrane is not altered either by traumatism or pathologic changes. Once this protective agency is in a measure diminished, local tuberculosis may manifest itself. The more frequently one sees tuberculosis of a given organ, the more reasonable it is to presume that the infection of that structure came about through the blood or the lymph current. The less frequently certain structures are involved, the more reasonable to suppose that some local cause must operate to overcome its invulnerability. This thought is supported in the classification of Grünwald, Walsham and others as well as in the clinical history. It is a recognized fact that the so-called primary lesions of the mouth are more sluggish and less malignant than the secondary varieties, the latter developing through blood and lymph current in an organism abundantly attacked by the tuberculous process. This though is further borne out by the slow and

comparatively non-malignant affections of the gums, the hard palate, the lips, the cheeks and the tongue, and the rapidly progressing, actively malignant course of tuberculosis of the pharynx and tonsils.

SUBJECTIVE SYMPTOMS.

Tuberculous lesions involving the tongue, the lips, the gums, may exist for some time before the patient is aware of their presence. Even ulcerating lesions may develop to a considerable extent before attracting attention. In this respect, these lesions differ from those involving the pharynx and larynx. The earliest manifestation is a sense of slight soreness or burning, marked particularly when the diseased surface is irritated by contact with food. Soreness may become decided pain, more especially when the lesions involve the tongue. When seen upon the hard palate or gums the pain rarely becomes severe, differing from the usual intense pain of tuberculous ulcers. There is localized swelling and slight increase in the secretion of the parts, which becomes viscid, grayish white or dirty. A slight odor is often apparent, although rarely becoming offensive. Even when the ulceration has gone on to marked necrosis of the underlying structures, the odor that is at time discernable may be attributed to the general cachexia of the individual rather than to the local lesions. Glandular involvement may or may not be present. I have seen it in very early lesions and have failed to discover any enlargement of cervical glands in cases far advanced. When it does exist it is rarely painful. In tuberculosis of the tongue, lips, gums or palate, the general symptoms of the patient are comparatively slight except in those cases which develop in the course of severe general infection, such as is found in a miliary process. These severe cases are usually marked by the rapid development of lesions extending to the soft palate, the tonsils and the surrounding pharyngeal structures when dysphagia and odynophagia of severe type, high temperature, rapid pulse, marked emaciation and exhaustion may be added to the symptoms.

OBJECTIVE SYMPTOMS.

Excluding those isolated instances of tumor and abscess,¹⁰ there is apparent to the most casual observer a definitely uniform local lesion. The general appearance is that of a pale, superficial ulceration without inflammatory areola, edges irregular in outline and beveled or undermined, tending to spread laterally, not deeply. A viscid, dirty white secretion covers the ulceration, which when cleaned away brings to view a more or less nodular appearance.

Scattered irregularly over the surface of the ulceration and upon its margins are seen small red, soft granulations, interspersed with pin head spots of yellow or gray. These yellow spots, the spots of Trelat," may be seen also upon the mucous membrane adjacent to the ulceration.

Case 1 (Figures 1 and 2) demonstrates very early as well as moderately advanced tuberculosis of the gums. This patient, aged 26, was first seen in December, 1906, having been referred by Dr Bergtold. He has had pulmonary tuberculosis one year. In August, 1906, the gums became sore. There was also some soreness in the nose and larynx, the latter inducing painful and difficult swallowing. A typical tuberculous ulcer was seen upon the left surface of the nasal septum. The larynx presented pale infiltration of both arytenoids with numerous small ulcers and grayish deposits. The gums over the first bicuspid on the right side of the upper jaw and over the first and second bicuspid right side, lower jaw, were seen to be covered with small redish nodules, very superficial ulcers and a few pin head yellowish spots. The typical tuberculous appearance of a very early lesion was readily demonstrated. Upon the lingual surface of the gums of the first and second molars, lower jaw left side, more advanced lesion was seen, possessing, however, the same characteristic nodular superficial ulceration with redish and yellowish spots. Although typical in appearance, repeated and thorough examination of curettings of these lesions by Dr. Todd failed to demonstrate the presence of tubercle bacilli.

The margins of the ulcerations are rarely indurated. Upon the tongue, however, a slight induration may be felt and especially where healing has occurred, leaving the organ markedly fissured. The character of these indurations is a fibrosis, which has occurred in the healing process.

Case II (Figures 3 and 4) shows a typical case of tuberculosis of the tongue. Figure 1 illustrates the fissured appearance which has resulted in the healing process. The induration on the margin of these fissures being marked. Figure 2 shows an active lesion at the tip of the tongue, presenting all the usual characteristics of tuberculous ulceration. This case was that of a man aged 35, who has had tuberculosis for seven years. He came to Colorado immediately upon development of the trouble. Eleven years ago or four years before pulmonary tuberculosis was detected, he had a small superficial ulcer upon the dorsum of the tongue, which refused to heal. Subsequently similar ulcerations on the dorsum developed and continued active for an indefinite period. The patient cannot

state exactly when healing began. One year ago the ulceration upon the tip developed, which was extremely painful, a symptom which did not obtain in the ulceration upon the dorsum. When seen at the National Jewish Hospital for Consumptives in December, 1906, the healing process upon the dorsum of the tongue was complete with the exception of two small lesions. The tip of the tongue, however, was in a condition of active ulceration. Careful curettings from the dorsal as well as tip ulcers, showed tubercle bacilli in intimate relation with the epithelium cells. At the present time, May 23rd, 1907, the patient's general condition is slowly failing, the ulceration upon the tongue, both dorsal and tip, are perfectly cicatrized.

When the disease extends to the soft palate, the anterior or posterior pillars, the uvula or the tonsils, a somewhat different picture presents itself. The very earliest appearance is a marked pallor which is heightened by an edematous swelling. This edema may be extremely slight, but it gives to the structure a characteristic appearance. Very careful observation will reveal the presence of numerous yellow or grayish pin head spots just under the surface of these pale, edematous structures.

Case III. (Figure 5.) This condition is typically illustrated by the following cases. C. Mc., male, aged 28, referred to me Oct. 2nd, 1906, by Dr. S. Solis Cohen of Philadelphia. The patient had slight pulmonary involvement and a tuberculous ulcer of the left arytenoid and vocal band. These lesions had improved under Dr. Cohen's treatment, the improvement continuing after coming to Colorado. On the 27th of February, 1907, both tonsils were swollen, pale and dotted with a few small grayish deposits. The posterior pillars were slightly edematous. The patient's general condition was failing. A small piece of tonsillar tissue was removed and sections made by Dr. Todd, who reported numerous miliary tubercles, giant cells and caseous centers. A few tubercle bacilli were demonstrated at the edges of the caseous areas.

Case IV. (Figure 6.) Male, aged 24, referred by Dr. Levitt of New York. This patient was presented before the section of Laryngology at the New York Academy of Medicine by Dr. Emil Mayer, Feb. 27th, 1907, demonstrating a possible primary lupus of the larynx. Upon examining the patient March 9th, there were found slight pulmonary involvement, swollen epiglottis, which was red and covered with pin head grayish tubercles and notched in the center, probably from a section removed. The aryepiglottic

folds were swollen, pale, edematous and covered with grayish deposits. The arytenoids were moderately swollen and pale. The patient's condition rapidly grew worse and upon April 9th, there was discovered on the right tonsil a whitish deposit. The left tonsil presented a small, irregular, nodular ulceration with whitish imbedded masses. Scrapings from both tonsils were submitted to Dr. Todd, who reported as follows: "The preparation from the left tonsil shows numerous cells, the structure of which cannot be clearly seen. Careful search shows very few tubercle bacilli scattered among them. The cover glass preparation from the right tonsil contains many squamous epithelial cells and a few other cells which cannot be made out distinctly, and some degenerated material. No tubercle bacilli can be found. Figure 6 shows distinct difference between the two tonsils, the right presenting an exudate upon its surface, while the left shows the typical tubercular appearance. The difference in the two tonsils as demonstrated clinically is borne out by the laboratory report."

Following the deposit of tubercles ulceration rapidly develops, the yellowish spots breaking down and coalescing in an irregular manner, giving to the surface of the ulceration the characteristic worm eaten or mouse nibbled appearance. When the ulcerations become deep, as they sometimes do, they still retain upon their margins the characteristic tubercular appearance. This is demonstrated by the following case:

Case V. (Figure 7.) Male, aged 44, advanced tuberculosis of the lungs and larynx of two years' standing. Three weeks before I saw this case the gums became sore and an ulcer developed upon the upper jaw. This seemed to be the result of loose and decayed teeth, which were plainly apparent. The ulceration is a typical deep tubercular ulceration extending to the alveolar process, which is itself necrosed, showing an exposed tooth root. A section of the margin of the ulcer was removed and the laboratory report gives the following: Granulation tissue and a few well defined tubercles with caseous centers; small numbers of tubercle bacilli scattered about the periphery of the tubercles.

Extensive ulcerations involving the soft palate and posterior structures are illustrated by:

Case VI. (Figure 8.) Male, aged 40, advanced tuberculosis of the lungs, sore throat at times during the past seven years. For three weeks past there has been painful and difficult swallowing. Examination of the pharynx shows extensive mouse eaten appearance involving soft palate, both pillars of the fauces, tonsils, uvula

and posterior wall of the pharynx downwards to the left side of the larynx. The ulceration extending forward as far as the junction of the soft with the hard palate.

DIAGNOSIS.

The lack of scientific accuracy so frequently displayed in the diagnosis of tuberculosis of the mouth and pharynx is worthy of note. Any or every ulceration of the mucous membrane of the mouth or pharynx in a tuberculous individual is not necessarily tuberculous. It is feared that this has too often been believed and that it may be the reason so many cases of cure have been reported.

Illustrating this, I present:

Case VII. (Figure 9.) H. T., aged 32, tuberculosis of the lungs, one year. Ulceration on the under surface of the tip of the tongue for six months. These ulcerations are two in number and are not painful. They present a marked red, inflammatory areola, are irregular in outline and show nowhere any of the characteristic grayish or yellow spots, or redish granulations. They are evidently due to contact with the sharp lower incisors, aggravated probably by more or less persistent coughing. When last seen, May 19th, the lower ulceration had entirely healed without treatment.

The diagnosis is certain when there is a pale ulceration, without inflammatory areola, superficial, worm eaten in appearance, dotted with redish pin head elevations and having small yellow or grayish spots scattered throughout. An early diagnosis when the soft palate or tonsils are involved may be assumed when there appears an extremely pale, slightly edematous mucous membrane with small, sub-mucous, pin head, yellow spots.

These diagnostic features, however, are not always present, although they do exist in the vast majority of instances. In all cases the diagnosis should be confirmed by the microscopic findings, and in obscure cases this and the inoculation of Guinea pigs are the only positive tests. The finding of giant cells and caseous material together in sections is almost certain proof of tuberculosis.

In case of the ulcers, the laboratory confirms the diagnosis, according to Dr. J. C. Todd of the Pathological Laboratory of the Denver and Gross College of Medicine, in two ways:

1. Detection of tubercle bacilli, (a) by the microscope, or (b) by inoculation of Guinea pigs.
2. Detection of the histological structures of tubercle in stained sections.

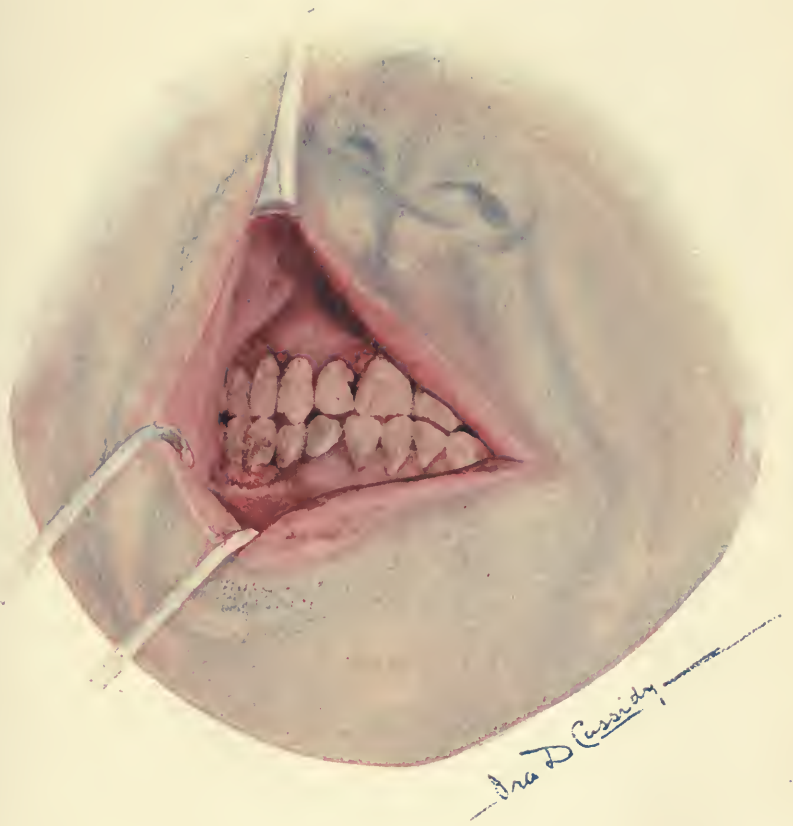


FIGURE I. CASE I.



FIGURE II. CASE I.



—Dra D Cassidy—

FIGURE III. CASE II.



FIGURE IV. CASE II.



FIGURE V. CASE III.

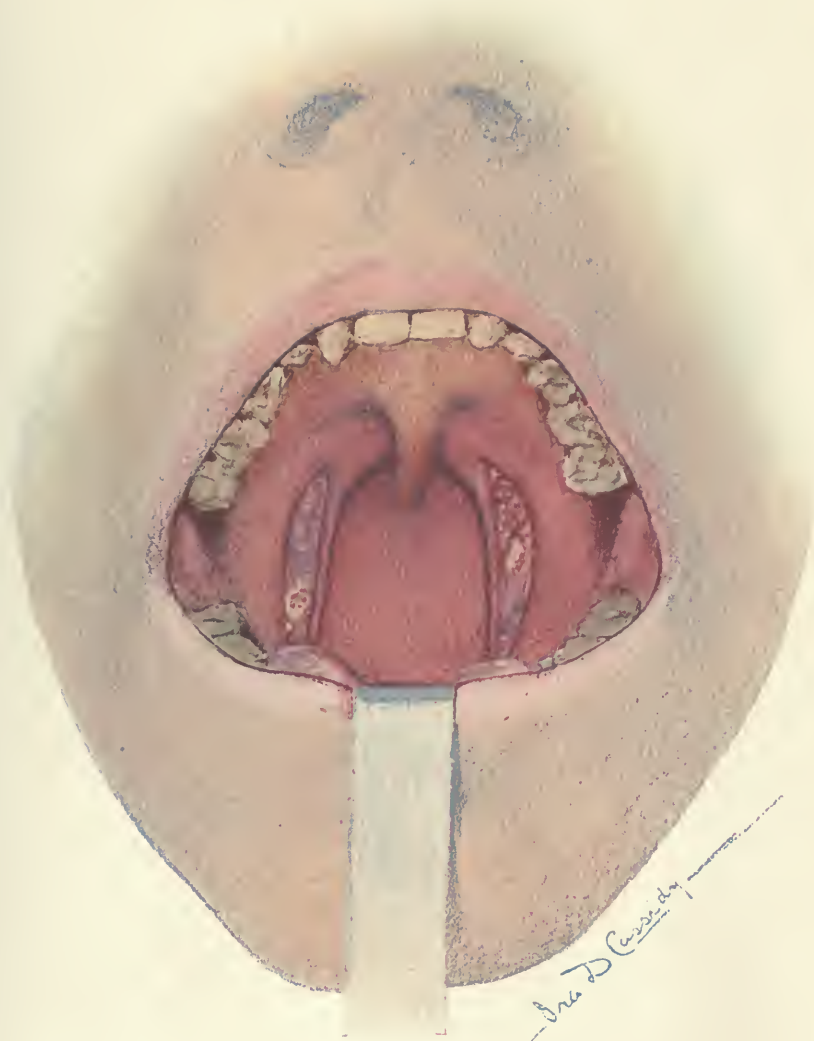


FIGURE VI. CASE IV.

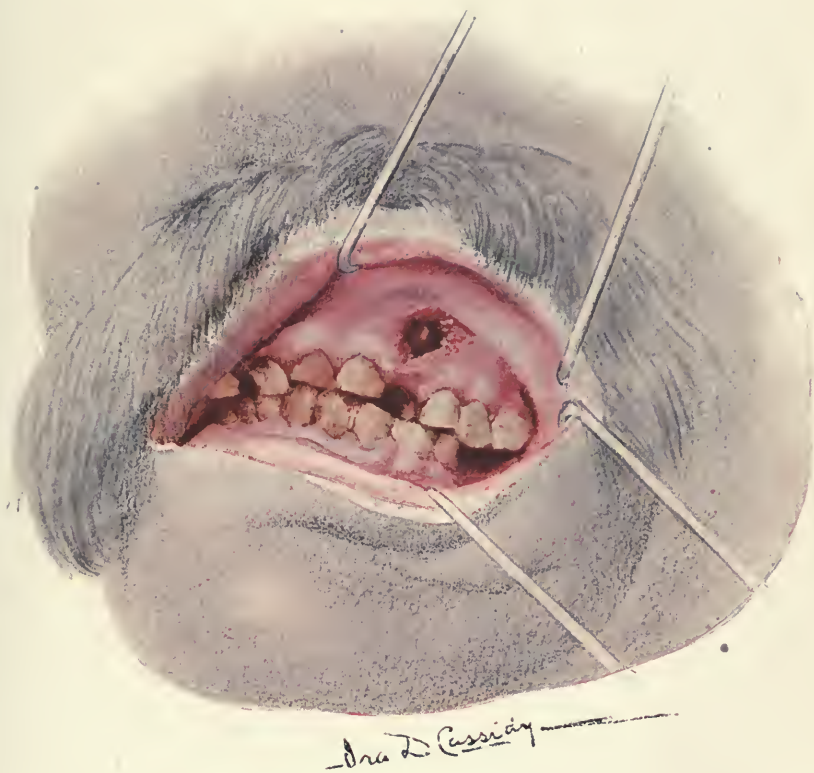


FIGURE VII. CASE V.



FIGURE VIII. CASE VI.



FIGURE IX. CASE VII.



FIGURE X. CASE VIII.



FIGURE XI. CASE VIII.

(1) Detection of the bacilli:

(a) Owing to possible presence of tubercle bacilli in the mouth, simple examination of swabs from the surface of the ulcer is of little value. The surface of the ulcer should be thoroughly cleansed and then under cocaine, curetted; or a piece of sufficient size for sections should be exercised. Curettings are to be thoroughly rubbed between slides or cover glasses until the cells are sufficiently dissociated to allow thin smears. The presence of tubercle bacilli in the smears may be taken as proof of tuberculosis, provided the surface of the ulcer was well cleansed, and this is made absolutely sure by finding the bacilli within the small clumps of cells which the rubbing between slides failed to separate.

When a piece of sufficient size can be excised, it should be sectioned and stained for tubercle bacilli. Tubercle bacilli are sometimes abundant even when the structure of the tubercle is very doubtful.

(b) Inoculation of Guinea pigs is resorted to only when other means fail.

(2) The histological structure of the miliary tubercle can generally be found in portions of tissue which have been sectioned and stained. Recognition of the tubercle depends upon the presence and, especially, the arrangement of certain structures; no one structure is diagnostic in itself, although its presence may be very suggestive. However, the presence of giant cells and caseation *together* may generally be accepted as proof when the structure is not otherwise typical and only as forming a part of a tubercle.

Grünwald¹² has shown how difficult it is to find tubercle bacilli in all tuberculous ulcerations. Hajek¹³ has also called attention to this fact in tuberculosis of the nose, therefore, one cannot place all of his reliance upon the presence of these organisms. With few exceptions will one fail to find them present if sufficiently long and accurate search be made. They are usually few in number and scattered and are rarely absent in typical lesions. In the cases presented under Figures 1 and 2, the local lesions were absolutely typical in appearance, but in spite of most thorough and repeated search, tubercle bacilli were not found.

PROGNOSIS.

When the affection involves the structures anterior to the soft palate including the tongue, gums, lips, cheek, hard palate, the prognosis so far as the general lesion is concerned is of comparatively little importance.

Case VIII. (Figures 10 and 11.) V. G. L., aged 58, has been ill with tuberculosis of the lungs for over fifteen years. Slight ulceration of the hard palate and gums were noticed in October, 1906. These lesions have been comparatively free from pain. There is, however, marked soreness and discomfort especially upon eating. Figure 10 shows a typical and characteristic tuberculous ulceration of the hard palate with beveled edges and nodular base. Figure 11 shows more advanced tuberculosis of the gums, rather deeper than usual with undermined edges, especially inferiorly. Careful curettings from both of these ulcers were examined by Dr. Todd, who easily demonstrated tubercle bacilli, but the entire absence of all other bacteria showed the thoroughness with which the parts were cleansed and proved conclusively that the tubercle bacilli were obtained from the surface of the ulcerations themselves and were not the result of contamination.

Tuberculous ulcerations rarely heal, but at the same time their progress is extremely slow. They are the source of but little discomfort and have no special bearing upon the course of an associated general or pulmonary tuberculosis except in so far as they indicate involvement of a small amount of additional tissue. Some of these cases have been said to heal spontaneously, others to have been cured by excision or cauterization. Unquestionably a few rare instances of such cures may be accepted as authentic, such cases representing that comparatively benign form described as "ectogenous" or "ascending." Bernheim¹⁴ states that in bucco-pharyngeal tuberculosis a cure is the rule. Gleason¹⁵ also states that the "Prognosis as regards healing is favorable." So firmly convinced am I that these statements are erroneous that I venture to question the diagnosis.

When tuberculous lesions involve the soft palate, uvula, the tonsils, anterior pillars and the structures posteriorly, the prognosis is of very much more significance. Not only is the prognosis of the local lesion absolutely unfavorable, but their effect upon the general condition of the patient is so deleterious that one can predict decline and an early and fatal termination. Lesions here are positive evidence of rapidly disseminating miliary tuberculosis.

Two exceptions to the above statements should be made. First, when the lesion involves the tongue the prognosis may be quite as unfavorable as when it involves the pharyngeal structures and second, comparatively benign lesion may exist in the posterior wall of the pharynx.

TREATMENT.

This consists in palliative and curative and should be both local and general. Palliative treatment is directed to the relief of pain. The local application of cocaine or of powdered orthoform are the most valuable remedies. Pain may also be mitigated by curetting and cauterizing, on the theory that the pain is due not so much to the exposed nerves as to the development of small neuromata upon the exposed nerve filaments.

Curative ulcers which involve a small portion of the tip or margin of the tongue, or localized tumors have been removed by more or less extensive, radical excisions. Temporary healing may be brought about by thorough cauterization followed by frictional rubbings with lactic acid or formalin. Galvano cautery has been of some avail and particularly have I seen early tubercular ulcers of the tonsils, lips and tongue healed under this treatment. Usually these healed ulcers reappear or there develop others adjacent to them. In spite of the generally accepted ultimate fatal outcome of these cases, one should not neglect an attempt at cure, and therefore, in addition to local treatment the usual attention should be paid to the patient's general welfare. Rest is of prime consideration, owing to the frequent presence of high temperature. The patient's nutrition should be maintained to the highest possible standard by the administration of large quantities of easily digested, nutritious food. When much pain exists this becomes a question of serious moment and local anaesthetics should be abundantly applied. Feeding by means of esophageal tubes cannot be recommended, for the passage of such a tube is of as much discomfort to the patient as the act of swallowing.

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THE TONSILS AND THEIR RELATION TO THE DEVELOPMENT OF TUBERCULOSIS.*

BY ERNST DANZIGER, M.D., NEW YORK.

The faucial and pharyngeal tonsils are circumscribed lymphoid masses, the larger part of which is contained in a connective tissue capsule.¹ They are lined on their exposed, buccal surface by a columnar epithelium, changing to a squamous epithelium in the follicles dipping down deeply into the stroma of the tonsils. The epithelium shows numerous defects, which, according to Stoehr, are physiological and meant for the transmigration of lymphocytes.

The tonsil itself consists of a stroma of connective tissue containing the blood and lymph vessels and within the meshes of the connective tissue net,—lymphocytes. In the depth of the follicles are germinating centers, where we find cells undergoing mitotic division. The newly generated lymphocytes wander either through the follicles into the buccal cavity or through the defects before mentioned into the deep layers of the tonsils and from there into the lymph vessels or blood circulation.

Wood² has demonstrated in a series of experiments the lymph drainage of the tonsils, by forcibly injecting into their tissue, aniline dyes. By doing so, he succeeded in injecting the vasa efferentia and showed, that the faucial tonsils drain into the superficial glands of the neck, and from there, into the deep anterior chain of the cervical glands, situated beneath the anterior border of the Sterno-Kleido-Mastoid muscle. The first gland of this chain he calls the tonsillar gland, which, if enlarged and pushed forward by other enlarged glands, is often mistaken for the submaxillary gland.

The pharyngeal tonsil drains into the retro-pharyngeal, suboccipital glands and from there into the deep posterior cervical glands, situated beneath the posterior boarder of the Sterno-Kleido-Mastoid muscle. Through anastomosis with retrosternal, peritracheal and bronchial glands infection can be carried directly to the pleura or the apices of the lungs³. The pharyngeal tonsil is situated at the roof of the pharynx, at the entrance of the respiratory tract, and inspired air comes directly in contact with it⁴. The faucial tonsils are situated at the entrance to the digestive tract between the

* Read before the German Medical Association, New York City.

palatine pillars, which compress the tonsils in the act of swallowing.

The physiological action of the tonsils consists in the production of lymphocytes. Goodale⁵ of Boston, demonstrated in a series of experiments, how the tonsils react toward the introduction of foreign substances. He applied a solution of carmine to a number of tonsils, the removal of which had been decided upon. After allowing different periods of time to pass he removed the same, and came to the following conclusions. After a short time carmine can be seen in the follicle. Here and there a leucocyte can be found containing a particle of the pigment. By and by, particles of carmine pass through the physiological defects and are surrounded in the subepithelial layer by leucocytes, the nuclei of which are frequently undergoing division. Later on, the carmine enters the deeper layers of the stroma and can even be seen in the lymph vessels.

Bacteria are not absorbed so easily. But tubercle bacilli have been seen by Dmochowitz⁶ and Wood⁷ penetrating the epithelium. Bacilli may enter the tonsils either through their own ability of locomotion, or through growing into them in colonies. The probability that they will penetrate into the stroma or not, depends upon, 1. Their number; 2. Their virulence; 3 The individual power of resistance; 4. The condition of the tonsil. The epithelium seems to be the barrier which prevents the entrance of bacteria; as soon as this is destroyed, the door is opened wide to all sorts of infection.

It is the infection with the tubercle bacilli, which I have selected as my topic in this connection. We all know, of how frequent occurrence chronically enlarged cervical glands are in children. We used to speak of scrofulous or lymphatic, diathesis in this connection. Schlenker⁸ and Krueckmann⁹ have proved through extensive examinations, that a large percentage of these enlarged glands are due to tubercular processes. The infection of these glands is either caused by a retrograde thrombosis of the lymph vessels originating in a pulmonary tuberculosis, or we have to look for the infection in the tonsils. For this reason they subjected all cases of adenitis cervicalis to a thorough investigation of the condition of the tonsils, and found histologically, in a great number, tubercular lesions. They found the same pathological conditions as Dmochwitz and Wood have described, namely: A small number of tubercle bacilli in the follicles, where they penetrate the epithelium. The latter is either

partly torn off the underlying connective tissue or is sometimes expelled en masse. In the subepithelial layers we find tubercles and giant cells. Concerning the frequency of tubercular lesions, the different investigators arrive at different results according to their method of research. One examines microscopically and regards every case as tubercular, where he finds tubercles and giant cells, although Pilliet¹⁰ could not produce tuberculosis by inoculations in a series of pharyngeal tonsils containing tubercles and giant cells. On the other side, the inoculation method, that is, the introduction of suspirous tissue into the peritoneum of an animal, is often unreliable, for the following reasons:

1. On account of the individual power of resistance of the animal.
2. On account of the possibility of an already existing tuberculosis. Therefore, we must always show a lesion at the place of inoculation.
3. On account of the possibility of the presence of tubercle bacilli in the secretions, without actual disease of the organ.
4. On account of the possibility, that the fragment of tissue used may perchance not contain a tubercular lesion, while the organ is diseased.

Therefore the two methods should be combined to arrive at trustworthy results. We have to distinguish two forms of tonsillar tuberculosis, the acute and chronic.

The acute tonsillar tuberculosis is found as a part of miliary tuberculosis or as a metastatic process in the last stage of pulmonary tuberculosis. It causes great destruction of tissue in the form of irregular ulceration and the surrounding non-ulcerated tissue is studded with the yellow miliary nodules. In contrast with the acute form, the chronic is nearly always latent and without symptoms. The latter disease is either primary or secondary. In cases of pulmonary tuberculosis the autopsy showed very frequently tonsillar tuberculosis, although no symptom had indicated such condition during life. Schlenker, Schlesinger, Walsham, Ito, Dmochowitz, Krueckmann and Strassmann found, in 136 cases of pulmonary tuberculosis, 94 cases of tonsillar tuberculosis, or 69%.

The infection of the tonsils in the secondary cases takes place through the sputum. During the act of coughing the sputum containing tubercle bacilli is deposited on the surface of the tonsil and forced into the crypts during the act of swallowing, where the bacilli enter the stroma. That the secondary lesions are not more

malignant and do not cause more destruction of tissue, may be explained by the fact, that the body has become immune to a certain degree by the previously existing pulmonary tuberculosis. Bandelier and Grawitz¹² have shown through their thorough observations, that the percentage of tonsillar tuberculosis increases in direct proportion to the amount of sputum. The first to observe primary tuberculosis disease of the tonsils is Lermoyez¹³. After the removal of the pharyngeal tonsil one of his patients lost ground rapidly and developed pulmonary tuberculosis. This occurrence made him examine the pharyngeal tonsils of 32 apparently non-tuberculous patients by the inoculation method, and he then discovered tubercular lesions of their organs. Brindel, Baup, Ruge,¹⁴ Diculafoy,¹⁵ Gottstein¹⁶, Pluder and Fischer¹⁷ corroborated his findings. Wood compiled from different sources 1671 cases with 88 primary tubercular tonsils or 5%.

How is the infection in these primary cases brought about? The pharyngeal tonsil situated at the entrance of the respiratory tractus receives the full impact of the inspired air. If once the tonsil is hyperplastic and has lost its epithelium through previous inflammatory conditions, it can readily be seen how the inspired tubercle bacilli have the right soil for their development and ravages. As soon as the pharyngeal tonsil has become so large, as to make nasal respiration impossible, mouth breathing takes its place and the infection of the faucial tonsils is then brought about in the same manner. But the most frequent course of the latter's infection is food, harboring tubercle bacilli. Orth¹⁸ and Baumgarten fed animals with tuberculous tissue and after a short time always found tuberculosis of the cervical and bronchial glands, later also, of the mesenteric glands without a demonstrable intestinal lesion. After the tonsils have become infected, the disease may remain localized, or the lesions may heal in the usual manner; or the infection may travel on to the cervical and bronchial glands, or directly to the pleura; sometimes, a breaking down bronchial gland may empty its contents into a small bronchus and thus infect the apices of the lungs. On the other hand, infection may reach the lymph current and through that avenue the general circulation and so cause a general miliary tuberculosis. One observer found, also, that infected retropharyngeal glands involved the cervical spinal column and so caused a Pott's disease.

We have to lay stress on the fact, that the chronic tuberculosis of the tonsils runs its course without symptom. If we consider, that the

processes take place in the depths of the crypts or in the superepithelial tissue, we cannot be surprised, that we are unable to make a clinical diagnosis of these lesions.

I examined clinically in the Country Sanitarium for Consumptives of the Montefiore Home, the tonsils of 100 patients, and in spite of the fact established by the before mentioned investigations showing, that 69% must be suffering from tuberculosis of these organs. I was not able to make a different diagnosis than "atrophic, hypertrophic, catarrhal tonsils or sometimes, yellowish accumulations of secretion in the crypts." Bearing in mind the postulate of Bandelier and Grawitz, I had the patients classified according to the amount of their sputum, but could not demonstrate clinically an increase of pathological tonsils in proportion to the amount of sputum.

But if we know of the possibility of primary tuberculosis of the tonsils, we should not be satisfied in tubercular cervical adenitis to remove the glands. We should first exclude pulmonary disease and in its absence examine the tonsils. Should we find them in any way abnormal, it becomes necessary to remove them. Otherwise we may leave behind the *fons et origo* of the infection and may expose the patient to the risk of repeated operations.

Furthermore the removal of the tonsils should be radical, as the lesions are situated in the depths of the follicles, which almost reach the connective tissue capsule.

If, after such operation, the patient fails to pick up, we have to start immediately the dietetic hygienic treatment to prevent the further spread of a possible tuberculosis.

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6 West 126th St.

The Treatment of Meniere's Disease by Means of Galvanism.

MARTIN SUGAR. *Arch. f. Ohrenh.*, Leipzig, Dec. 1904.

The author has obtained satisfactory results by the use of the galvanic current in the following manner. A large cathode is applied to the back of the neck and a smaller anode to the tragus on the affected side. A current of 1-20 milliampere is gradually increased to 5 milliampere and maintained for five minutes.

YANKAUER.

THE ETIOLOGY OF TUBERCULOSIS OF THE UPPER RESPIRATORY TRACT.*

BY GEORGE BACON WOOD, M.D., PHILADELPHIA.

The great factor in the etiology of the disease, tuberculosis, is infection with the specific germ, the tubercle bacillus. Tuberculosis of all organs has, of course, this common feature, and for the sake of conciseness the discussion of the etiology of tuberculosis of any individual organ or set of organs should not include the morphology and pathologic power of the tubercle bacillus, but rather be confined to the peculiar resistance which the organ under discussion offers to the invasion of this germ. As far as the nose and throat are concerned certain portions are peculiarly resistant to bacterial invasion, while other portions are comparatively easily invaded. This variation in resistance depends both on the anatomy and the physiology of the different parts.

When we consider that the large majority of individuals breathe through the nose, and that the air which is forced through the nasal passages has been practically filtered free from dust and bacteria by that organ, it seems remarkable that tuberculosis of the interior of the nose is so comparatively rare.

St. Clair Thomson and Hewlitt experimented with an apparatus which enabled them to collect the air as it came out through the choanæ. In a given quantity of laboratory air they found 29 mould spores and 9 bacteria; whereas, after the same quantity of air had passed through the nose it contained only 2 mould spores and no bacteria. This experiment was confirmed again and again. The question naturally arises, what becomes of those organisms which lodge in the nose as the result of this filtration? The same experimenters placed a pure culture of the *Bacillus Prodigiosus* on the septum well within the vestibule. A diminution in the number of bacteria could be noticed within fifteen minutes, and practically no trace of the bacteria could be detected after eighty minutes; and after two hours had elapsed in no case could any growth be obtained in cultures from the spot inoculated.

This opposition of the nasal mucous membrane to the growth of bacteria was also demonstrated by Malatto. Piaget declared that

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the nasal cavity, with the exception of the vestibules, both in man and animals, is nearly free from germs. He says that this asepsis is largely dependent upon a bactericidal action of the nasal mucus, and that this mucus is absolutely fatal to the anthrax bacillus, the diphtheritic bacillus, some forms of streptococcus and staphylococcus, the colon bacillus and some other germs. Inglauer, on the other hand, states that normal nasal mucus does contain a certain number of bacteria, but he admits that the nasal fossa rids itself of a large number of the bacteria inspired. Wurtz and Lermoyez, in a recently published research, again demonstrated that the nasal mucus is bactericidal to the anthrax bacillus and to other germs to a greater or less extent. They obtained the nasal mucus from normal individuals by placing bits of packing in the nasal fossæ, the fossæ having been previously washed out and cleansed. The mucus in the fresh state and also after it had undergone sterilization was mixed with bouillon containing anthrax bacilli, and even after three weeks of incubation no growth could be found, and inoculated guinea pigs gave negative results. Parker and Wright, however, found the nose sterile in only 6 out of 36 normal individuals, but the non-sterile cases gave very few colonies.

In summing up the evidence which I have just gone over, it would seem that the mucous membrane of the nasal fossæ exerts an inhibitory influence upon most bacteria, and that most probably this inhibitory influence is due to the bactericidal action of the nasal secretion. It must not, however, be supposed that the nasal mucus is equally antagonistic to all germs, and it concerns us especially to determine if possible its action on the tubercle bacillus.

Strauss, in 1894, found virulent tubercle bacilli in the nasal cavities of persons who, not having tuberculosis themselves, were in more or less constant attendance upon tuberculous patients. The dirt, solid particles and mucous contents of the nasal cavities were removed by sterile cotton swabs from twenty-nine persons, including hospital patients, internes, and patients suffering from chronic maladies other than tuberculosis. The inoculations made with the material thus obtained showed that about 40% of persons examined had virulent tubercle bacilli in their nasal cavities.

Freudenthal, in 1896, investigated the naso-pharynx of 133 patients, 52 of whom were tuberculous and 81 suffering from some other diseases. Tubercle bacilli were found in all of the 52 tuberculous patients, and in 9 out of the 81 non-tuberculous.

In 1900, Jones removed the dust and crusts from the nasal mucosa, making inoculation tests with the material thus obtained.

Thirty-one animals were used. The majority died of some unknown infection, but three showed distinct tuberculosis.

Lake holds that the nose very seldom forms a mode of entrance for the tubercle bacillus into the body. Under his direction, Lucas made cover-glass preparations from the nasal cavities of 50 tuberculous patients, in all of whose sputum tubercle bacilli were present. In only one case were tubercle bacilli found, though 80% of these cases showed some form of organism.

Guinea pig inoculations made by myself from four persons who had been more or less in contact with tuberculous patients gave negative results. I obtained the material by swabbing the floor of the nasal cavities with sterile cotton-wrapped applicators, washing them off in sterile water, and inoculating this water into the abdominal cavities of guinea pigs.

In a certain per cent of persons undoubtedly virulent tubercle bacilli will be found in the nasal cavity, but that they stay there for any length of time is not probable, so that tuberculosis of the nasal fossæ should be a comparatively rare condition.

Knight says that up to 1901 there had been 108 cases of tuberculosis of the nose reported. Ernst Pasch in 1905 reports 17 cases coming under his own observation. Other sporadic cases have been reported since then, among them one by Onodi and Rossi, and one by Marcelli, both of which were supposed to be primary.

It is very likely that a large number of cases of tuberculosis of the nose are overlooked, but even then it is remarkable that so few cases have been reported. A case of primary tuberculosis of the nose would, on account of its infrequency, undoubtedly be published. Personally I have never seen a case of primary tuberculosis of the nasal fossæ, and though I have had a fairly large experience during the last three or four years in examining the nasal cavities of cases of pulmonary tuberculosis at the Phipps Institute, I have seen very few secondary involvements.

Summing up, it would seem that the nasal cavities are only rarely infected with the tubercle bacillus, probably because the time necessary for the propagation of this slow-growing organism permits the cilia of the nose and the nasal secretions to remove it from the fossæ; but it is also very likely that the nasal secretions themselves are directly inhibitory to its growth.

Tuberculosis of the pharynx should be considered as practically identical with tuberculosis of its lymphoid tissue. I doubt if the stratified squamous pavement epithelium, washed continually with

a downward flow of mucons, is ever infected by the tubercle bacillus, except through the lymph-follicles, the lateral folds of the pharynx or one of the four tonsils. Statistics on pharyngeal tuberculosis are of little value in confuting or supporting this statement, because the large majority of writers have not differentiated between an ulcer on the lymph-follicles or the lateral folds from one situated between these structures. If we include under the term "pharyngeal tuberculosis" lesions of its lymphatic tissue then tuberculosis of the pharynx is not very rare.

There is a great discrepancy in the reported percentages of secondary pharyngeal tuberculosis, while Levy reports 67 cases in 500 autopsies; Böcher reports only 12 cases in 2950; and Lublinski 5 in 1,600. However, the average percentage of all these cases would be 1.4%, which corresponds pretty closely with the 1% of Guttman.

Sokolowski in 1903 called attention to the frequency with which the lateral folds of the pharynx become tuberculous, and showed that the condition resembles very closely the so-called latent tuberculosis of the tonsils, and like this condition in the tonsils the disease can be diagnosed only after portions have been removed and put under the microscope. In 13 cases of tuberculosis which he examined, 8 showed involvement of the granular tissue of the pharynx or of the lateral folds, that is $61\frac{1}{2}$ per cent.

Cordes speaks of pharyngitis lateralis as the formation of a new small elongated tonsil; meaning by this that hypertrophy of the lateral folds of the pharynx is accompanied not only by hyperplasia of the lymphoid tissue but also by the formation of veritable crypts and follicles. It would seem, therefore, that the discussion of the etiology of tuberculosis of the pharyngeal mucosa would best be included in the discussion of the etiology of tonsillar tuberculosis.

When we come to consider the comparative susceptibility of the various parts of the upper respiratory tract to tuberculosis, preference for liability to infection must be given to the tonsillar tissues. Let us consider the evidence which justifies this proposition. The crypts, which are characteristic of all tonsillar tissue, afford a comparatively open door for microbic invasion. The lumen of the crypt acts almost as an incubator, and the peculiar disintegrated condition of the lining epithelium does not, like the stratified epithelium of the mouth, present a mechanical barrier. The penetration of bacteria into the tonsil parenchyma is prevented

almost solely by the vital resistance of the living tissue, and if the pathogenic power of the invading germ is sufficient there is practically no hindrance to its entrance within the confines proper of the human body. Both research work and clinical evidence afford abundant proof of this theory, demonstrating the peculiar susceptibility of tonsillar tissue to infection, and the ease with which virulent micro-organisms may pass through its structures.

The results of all the research work done in relation to general microbic invasion through the tonsils show that in the tonsil more than anywhere else on the body surface, external and internal, the penetration of the invading germ depends not so much upon any mechanical barrier presented by the tissue as upon the relative virulence of the germ. Therefore, because the streptococcus can infect the tonsil it does not follow that the tubercle bacillus can do so, and as we are speaking now only of tuberculosis it is not necessary to go into the details of the work done in relation to general microbic infection through the tonsils.

In active pulmonary tuberculosis there is a certain dosage of tubercle bacilli spread fairly equally over the upper respiratory tract, excepting the nose and nasopharynx, and it is probable that the frequency of secondary infections of the various parts will give a fair index to their relative susceptibility. Permit me to quote from a paper published by myself in 1904. The tonsils of 136 cases of pulmonary tuberculosis were examined by seven different observers, and in 94, tuberculous involvement was diagnosed, that is 69 per cent. The diagnosis in these cases was made chiefly by histologic examination. In very advanced cases of pulmonary tuberculosis the tonsils almost never escape infection. In 9 cases reported in 1904, in which I made post-mortem examination, the tonsils in every one showed tubercle with giant cells, and in 38 cases examined during the past year I found histologic changes typical of tuberculosis in 35, and I believe they would have been found in the remaining 3 if the whole of both tonsils had been sectioned.

This predilection of tuberculosis for the tonsils has been confirmed experimentally by Bamp, Ravenel, and later by myself. In experimenting on hogs, I found that the tonsils could be inoculated by a single swabbing with virulent bovine tubercle bacilli, but not once in the whole series of experiments was there found any lesions in the upper respiratory tract outside of the tonsils.

It would seem that all that is required to produce tuberculosis in the tonsil is to bring in contact with this organ a number of bacilli sufficient to overcome the tissue resistance. Tuberculosis of the tonsils should then be the most frequent form of primary tuberculosis, as both food and air must first pass over these structures before gaining access to the more interior organs, and I believe this is true. In a series of 1671 cases of hypertrophied tonsils, compiled from the published records of twenty-three authors, primary tonsillar tuberculosis was diagnosed in 88, that is 5.2 per cent. I found about the same proportion myself in perfectly unsuspected cases, where the tonsils had been removed by operation and were only casually examined. It would seem safe to assume that at least 5 per cent of children have tuberculosis of the tonsils.

Probably in the majority of cases on which these statistics were based the tonsils examined were removed because of their enlargement, and therefore one is hardly justified on that ground alone in giving 5 per cent as the frequency of tonsillar tuberculosis in all children. We must, however, remember that the size of the tonsil bears no relation to the liability of infection, except that its enlargement presents, as it were, a larger net to entrap the organisms. From my examination of tonsils from persons who had died from pulmonary tuberculosis, the hyperplastic tonsil is apparently more resistant to tuberculous infection than the small tonsil in which there was very little lymphatic tissue. This observation, however, is based upon too insufficient evidence to be accepted in any other light than a suggestive one.

While it is scarcely within the scope of this paper to treat with such a large and important subject as the method of infection in pulmonary tuberculosis, it may be allowable at this time to speak briefly concerning the liability to systemic infection from tuberculosis lesions in the tonsils. Cornet, in an elaborate series of experiments believes he has shown that the tubercle bacillus is capable of producing disease in any organ to which the germ gains access. If a given part of the body is inoculated the lesion develops locally, and is generally promulgated through the lymphatics to the nearest set of lymph nodes. The bacillus is arrested in these nodes and cannot proceed further until destruction of this barrier has been accomplished. When this resistance has been overcome then the infection proceeds to the next chain, and finally via the lymphatics to the venous system. The tonsils may be

described as differentiated lymph glands, but it is not probable that they possess the same filtering qualities as the lymph nodes. By rubbing a virulent culture of bovine tubercle bacilli on the surface of the tonsils of the hog, I once succeeded in finding the tubercle bacillus in the regionary lymph gland of the neck within five days after the inoculation, and no demonstrable change could be found in the tonsillar tissue. In this same series of experiments, I further found that histologic changes appeared as early in the cervical lymph node as in the tonsil. Further, we know from clinical experience how quickly the cervical nodes at the angle of the jaw become enlarged and tender during infection of the tonsil, and that for a long time this tenderness is confined to the first set of glands. Hence it is evident that tuberculosis of the tonsils would very likely show the same clinical course as that of tuberculosis of the cervical lymph nodes.

Recently, several articles have appeared concerning the possibility of infection of the apices of the pleura and of the bronchial and mediastinal lymph glands from the upper respiratory tract via the cervical lymph chains. Grober, in 1900, believed he succeeded by injecting the region of the tonsils in living animals with India ink in getting the pigment to travel via the cervical lymph glands to the pleural apices and to the bronchial lymph glands. Fleiner had previously stated that the supraclavicular glands were anatomically directly connected with the other cervical glands, that is the deep lateral chain, and were at the same time regionary to the pleural apices. The clinical support which Grober brings to substantiate his theory is chiefly that the statistics collected from five different observers show that in 14.3 per cent of cases with tuberculosis of the glands of the neck the pleura became involved. There is no doubt that Grober has done a great deal of valuable work in this connection, and from a mere perusal of his paper he seems justified in his conclusion that infection of the pleura may take place via the cervical lymph glands.

During the last year, an article has been published by Beitzke, going over this same subject very carefully, making both anatomical studies and experimental researches, also giving the data furnished by the post-mortem on 55 children. He directly opposes Grober's theory, and criticises his work, believing that his results do not justify his conclusions. His work has been most carefully carried out, and I quote his conclusions.

"1. There exists no lymph vessel leading from the chain of cervical lymph glands to the bronchial glands.

"2. Tuberculous infection of the lungs from the cervical lymph glands can take place only through the lymphatic trunk and the venous system.

"3. This path of infection, at least in children, is without any practical import. The infection of the lungs, and hence the bronchial glands, in children as a rule takes place through aspiration of the tubercle bacillus into the bronchi; a descending cervical tuberculosis may be present incidently.

"4. The aspirated bacilli may be in the respired air but they come from the mouth where they have gained access by food or by contact."

During the past winter I started a series of anatomical studies along the same line but unfortunately have not yet been able to complete them. The results I have so far obtained, however, support entirely Beitzke's claim concerning the connection between the supraclavicular lymph glands and those higher in the neck. On the other hand, in children the arrangement and number of the lymph nodes in the neck is very irregular, and the pleural apices come into fairly close relation not only with the supraclavicular glands but also with the extreme lower portion of the greater vessels of the neck. The deep lateral chain of the neck extends downward along these vessels, and if there should be a node situated in the lower part of the neck, as sometimes occurs, it is conceivable that tuberculosis of this node may infect the pleural apices directly by continuity of structure. It would seem, therefore, possible that the pleural apices may in some few cases be infected by descending tuberculosis of the lymph glands of the neck, but for the tonsillar lesion to reach this distance there are a great many lymph nodes which must first be broken down and overcome. However, Beitzke would probably be correct in the large majority of cases when he says that infection of the lungs may theoretically occur from the cervical lymph nodes but that it would almost always be a miliary lesion due to the entrance of the bacilli into the venous system via the jugular lymph trunk. Miliary infection of the lungs was the only pulmonary lesion in my experiments on hogs, and this occurred only after all the nodes of the cervical lymph chain were broken down.

Another very probable source of systemic infection from local disease of the tonsils, especially from the pharyngeal tonsil, may

come from the disintegration or breaking down of the tonsillar tissue and diseased portions being swallowed and inoculating the gastro-intestinal tract or the mesenteric glands. A lesion, however, to do this would not belong to the so-called latent type but must be ulcerative and hence recognizable.

To sum up these various conflicting views is somewhat difficult, but it seems to me that as a rule the clinical importance of a tuberculosis lesion in the tonsillar tissues of the throat is about the same as a local tuberculous lesion in any other non-vital portion of the body, which is separated from the internal organs by an intervening chain of lymph nodes.

The etiology of laryngeal tuberculosis has been so extensively discussed of late years that it is hardly worth while to enter upon this subject, especially as I know of no new facts to offer. Probably the best synopsis of the subject will be found in the last edition of Lake's Monograph on Laryngeal Phthisis. I would, however, like to call attention just to a few facts.

It is unquestionable that primary tuberculosis of the larynx has occurred though it is exceedingly rare. Aronsohn has collected 34 cases which he divided into three groups; in the first group, those in which post-mortem examination showed tuberculosis of the larynx without involvement of the lungs, only 3 have been reported; in the second group, there were 9 cases in which were found advanced or old disease of the larynx with recent infection of the lungs; and the last group, 2 cases in number, were based upon clinical examination only. In other words, there has been at the time of Aronsohn's paper only 3 cases reported in which the primary condition of the laryngeal lesion had been anything like proven. Lake says that the term "primary laryngeal tuberculosis" implies an original invasion of the larynx in the absence of any pulmonary phthisis, and does not, necessarily, exclude the presence of some such lesion as a tuberculous adenitis or otitis. To me it would seem better that by the term "primary involvement" it should be understood that the organ under discussion is the first in the body to show any lesion, and that the lesion must be termed secondary if it follows disease of some other organ, no matter how small or insignificant that organ may be. It is easily conceivable that the larynx may be infected from a tuberculous otitis, and such lesions should be placed under the secondary laryngeal infections and not looked upon as primary. Two such cases have been reported by Lake.

The method by which the tubercle bacillus gains a foothold in the laryngeal mucosa probably varies in different cases. In a very few cases the organism may penetrate through the unbroken epithelium, as demonstrated by Wright. It may enter through the gland-ducts, and this is probably the line of infection when the lesions begins in the ventricles. The erosions caused by the traumatism of cough and the constant irritations of large quantities of decomposed sputum may become infected with tubercle bacilli. This method of infection is probably the most common way in ulceration of the true vocal cords. Lake has found in the epithelium minute abscesses, which he believes might finally have become tuberculous. Briggs calls attention to the early erosions as marking the stage where simple catarrhal laryngitis becomes tuberculous. Be the method of penetration what it may, the essential element in the infection is the enormous and constant dosage to which the larynx is subjected.

129 S. 18th St.

The Surgical Reduction of the Excessively Large Ear. CHAS. C.

MILLER, Chicago. *Med. Fortnightly*, July 25, 1907.

Dr. Miller asserts from experience that: "There is a demand for men capable of performing operations intended to improve the appearance, and in the regular profession I believe this is the only special field which is not overcrowded. So far as I can learn, I have the world to myself in this respect, and am the only surgeon who performs any considerable number of these operations." To perform any of the operations for reducing the enlarged ear infiltration is all that is required to render them painless, and is accomplished with a very weak cocain solution. The author describes and illustrates with cuts three operations: The crescent-shaped excision, the triangular excision, and the sickle-shaped excision. The last should be performed posteriorly, so that the skin anteriorly is not sacrificed. Essentially it is the excision of a sickle-shaped portion of the cartilage with the posterior part of the integument. It is, in short, a sort of sub-integument resection. All these operations are plainly illustrated by drawings, and the descriptions in the text are brief and clear.

EATON.

THE BANEFUL INFLUENCE OF PREGNANCY ON LARYNGEAL TUBERCULOSIS.*

BY WOLFF FREUDENTHAL, M.D., NEW YORK.

In bringing the above subject, which has been discussed so extensively abroad, to the attention of this large and experienced audience, it is not so much the desire of the writer to present his own observations, as to elicit a full discussion by all who have seen cases belonging to this category.

Right here permit me to mention one question, viz., that of primary tuberculosis of the larynx. While not denying the possibility¹ of a primary infection of the larynx, I shall eliminate it entirely from this paper solely to facilitate the discussion. Consequently we have to deal here with those cases of laryngeal tuberculosis which are associated with a pulmonary affection.

The first question that confronts us, is: Has pregnancy any influence in producing laryngeal tuberculosis in a person already afflicted with tuberculosis of the lungs? It is impossible to give a direct and satisfactory answer to that. Personally I believe that after the tuberculous virus has once gained entrance into the system (lungs) it is apt to form a new focus, wherever there is a locus minoris resistentiae. This law holds good for syphilis, carcinoma and other systemic diseases as well. Now if the larynx has been weakened previously by inflammatory attacks it will be more prone to become tuberculous at the slightest provocation. And gestation may well be considered such a factor. But a direct influence in causing laryngeal tuberculosis cannot be proven.

On the other hand, how is it, if laryngeal tuberculosis is already established? Has pregnancy then a deleterious effect? To this we must decidedly answer in the affirmative. Gestation can undoubtedly light up an old process that has practically been arrested, and it is a positive contributing cause in rendering worse an already existing one.

But let us consider for a moment certain physiological conditions belonging to pregnancy. With the growth of the foetus the mother requires not only nourishment for herself, but a constantly increasing supply for her offspring. Everyone is aware of the difficulty of nourishing any phthisical patient; how much more difficult is the

* Read before the Thirteenth Annual Meeting of the American Laryngological, Rhinological and Otological Society, New York City, May 30, 31, and June 1, 1907.

1. I say purposely "the possibility," altho I have never seen a primary tuberculosis of the larynx. The cases shown by others as well as some doubtful ones in my own practice have not convinced me that the lungs were free from tuberculous invasion.

task, if the maternal organism has to assimilate food for two instead of one being? Is it therefore, surprising that we so often fail in the attempt and that the pulmonary tuberculosis grows worse and with it, *pari passu*, the affection of the larynx?

Furthermore, with the growth of the child the abdomen expands and breathing becomes more difficult. Add to this some obstruction in the larynx, as for example perichondritis of the arytenoids, interarytenoid tumefactions, extensive infiltration of the vocal cords, etc., and you have a second factor that helps to impair both the general condition and with it that of the larynx as well.

During pregnancy there are certain other conditions that are not entirely physiological. They too have no beneficial influence upon tuberculosis, but on the contrary accelerate the process. Among these may be mentioned anemia, which here acts so perniciously, as well as a large variety of neuralgias.

A direct influence on laryngeal tuberculosis is exercised, however, by a symptom which is as painful, as it is deleterious, viz., vomiting. With each act of vomiting, which occurs more or less frequently in almost all women during the first months of pregnancy, there is marked irritation of any existing ulcerations in the larynx, with increase of the pain and dysphagia previously present. A similar, and more deleterious influence is exerted by the cough, whatever may be its source. It is easy to understand that under such circumstances the chances for a cure of any laryngeal affection are almost nil.

Occasionally paroxysms of coughing or vomiting are so severe as to induce premature labor. More often, if this does not occur, the patients get worse rapidly. If they survive the accouchement they die as a rule very quickly afterward. For though pregnancy is fraught with danger to the life of the phthisical mother, childbirth, according to all experience, is still more so. Few women with tuberculosis survive this period for any length of time, as the cardiac weakness consequent upon the loss of blood cannot be repaired. This is the experience of many observers, though not of all. Now while there are differences of opinion in regard to the purely pulmonary cases, the views are somewhat more uniform concerning the influence of pregnancy upon tuberculosis, if complicated by involvement of the larynx. "Whether pre-existing or developing in the course of gestation, this form of tuberculous affection is always markedly increased during pregnancy. This typical unfavorable development of the disease and the danger of suffocation, in case tracheotomy cannot be performed in time, has led

to the almost general acceptance of laryngeal tuberculosis as a positive indication for the artificial interruption of pregnancy." Thus speaks an obstetrician, H. Ehrenfest. (Peterson's Practice of Obstetrics, p. 346).

But do not let us dwell on the latter point as yet. First, we must answer the questions: What becomes of the mother, if we let gestation go on to the end of the normal period, and what becomes of the child? I have seen an unusually large number of such cases in my practice, in which the mother invariably died shortly after delivery, and the child in almost every instance. A gloomier outlook can, therefore, hardly be imagined, and the question of treatment was settled in my mind long ago. Great was my surprise, when, a few years ago, Professor A. Kuttner, of Berlin, took up the question and discussed it in that thorough manner we are accustomed to expect from him. Then it became evident that there was not such a unanimity of opinion as was believed before. K. gathered statistics from different sources and presents the following data: "* * * If we deduct from that number (100) three cases in which pregnancy was interrupted in the third or fourth month with beneficial result, only seven of the others survived the confinement, while all the rest succumbed quickly, following a deterioration of the laryngeal and pulmonary condition." These statistics furnish as bad a prognosis as my own. Nevertheless cases have been published, off and on, which were intended to show the fallacy of the rule first laid down by Kuttner. Thus Lennhoff exhibited a patient before the Berlin Laryngological Society who had survived childbirth and in whom the disease apparently did not run the usual fatal course. But at a later meeting of the same society Kuttner was able to show that even in this instance childbirth was the turning point for the worse. The woman ran down rapidly after confinement and the outlook was in no wise favorable.

Soon after I started here in practice, the first of these cases came under my observation. The patient died three days after giving birth to a dead child. The next case occurred a year later with the same result, only that the child was kept alive with the greatest effort for two years. And so it went on. In every instance the mother died, and, with one exception, the child, too, until I finally established the rule that to let such a woman carry her child to the full term would mean the death of both.

In my history books there are ten cases, but I am positive that during the last twenty-one years I have seen many more, per-

haps double that number. This may seem unusually large in the experience of one man, but it is probably due to my long connection with tuberculous hospitals in this city. It will not be necessary to give the histories of all in full, but three cases may suffice.

Case 1 (No. 2 in my statistics). Mrs. S., primipara, aet. 23, was seen by me in March, 1888. She was in the ninth month of pregnancy and suffered greatly from dysphagia. There were ulcerations on both vocal cords and the interarytenoid space. Both lungs were affected. Local treatment did not ameliorate the condition in the larynx, and at the normal end of gestation she gave birth to a dead child. Twelve days later she also died. There was no reason for inducing premature labor in this case, for it could not have saved the mother, as pregnancy was too far advanced.

Case 2 (6). Was seen in consultation with Dr. M. She was a sextipara and had acquired tuberculosis, apparently, before becoming pregnant. At least, cough had been present for some time. This was a wretched case. When I saw her first in October, 1885, she was in the fifth month and appeared quite weak. There was an infiltration of the right vocal cord, an ulcer on the anterior third of the left one, and the arytenoids showed oedema. Apparently only the right apex was tuberculous. For that reason I advised immediate resort to abortion, which was refused for religious reasons. Consequently the usual remedies were applied to the larynx, but the woman grew rapidly worse. When I was called in again five weeks later, the scene was almost tragic. To hear that wretched woman with her husky voice scold her family physician for not having treated her exactly as I had advised, and then begging his pardon, only to tell me a moment later that the whole medical profession did not know anything, and then again to pray of us to save her for the sake of her five little children, was pitiful, to say the least. One week later the Parcae cut the thread of her life.

Case 3 (8). A woman was brought at the close of her pregnancy to St. Mark's Hospital suffering from tuberculosis of one lung and of the larynx. In the latter there was a diffuse infiltration and a deep ulcer on the epiglottis. When I told the gentlemen present that, according to my experience, the prognosis *quoad vitam* was absolutely unfavorable, there was great surprise. On the sixteenth day after childbirth the woman died. The child, I hear, lived for several months. In this case, too, the interruption of pregnancy at such a late period would not have been of any benefit, but an early abortion might have saved the mother.

Such is the fate of the mother. How about the child? According to K., 72 to 73% of the children died immediately after birth or within a few weeks afterward. This is certainly a very low percentage, but still more perplexing are the statistics by Weinberg of Munich. Out of 321 children born alive, whose mothers died within a year, not less than 217 (67.9%) died in the first year. Of the 57 infants born alive, whose mothers died in the first twenty-eight days of the puerperium, as many as 37, or 78.8%, succumbed in the first year. And this apparently was the case with women afflicted only with pulmonary tuberculosis. In the presence of a complicating laryngeal tuberculosis, the prognosis for mother and child is so unfavorable that H. W. Freund¹ considers the former as the most important of all indications for the early interruption of pregnancy.

But there is another side to this question. Have we a moral right to sacrifice an unborn child in order to save a mother, whose life, as some maintain, is also doomed? This question has been asked me by physicians as well as laymen, and it is proper to answer it now.

In regard to the lives of children born of such mothers, the above statistics, which are supported by my own experience, speak a very clear and sad language. I recollect only one instance of a child that lived as long as two years. What became of it afterwards is unknown to me. As K. has shown, however, of those who survived for more than a year only a small percentage could be reared with the greatest care in well-to-do families, and even these children were weaklings.

What about the mothers? Is the percentage of deaths really equal 100%? Not in my experience, nor in that of others, when pregnancy is interrupted at an early stage. The reports on that point are meager, but every such case counts. Thus Levinger, of Munich, saw two cases. The first one which died in the puerperium, had a tuberculous tumor in the larynx that caused dyspnoea. Tracheotomy could not save the woman. In the second case, however, abortion was induced at the end of the fifth month, and the laryngeal tuberculosis was afterwards "permanently" cured, the lungs apparently, too.

The writer can report two cases that were saved.

Case 1 (No. 8 of my statistics). Mrs. F. M., aged about 30, mother of two very delicate children, was referred to me, on

1. Quoted from Gustav. Freitag's Inaug. Diss.: "Die kuenstliche Unterbrechung der Schwangerschaft wegen Tuberkulose." Breslau, 1906.

February 18, 1901, on account of pain in the left ear and persistent cough. The ear was normal, but there was an ulceration on the left ventricular band, and the upper lobe of the left lung was affected. Tubercle bacilli in the sputum. She was treated for several weeks and then left for Asheville, N. C. Afterwards she went to Germany, consulted Prof. v. Leube and other well-known men, and returned to this country at the end of 1902 greatly improved. I had warned her against conception, but upon the advice of a good friend she became pregnant, expecting in that way to get rid of all her trouble. Instead of this, the old laryngeal symptoms returned with renewed activity. When I saw her an immediate abortion was recommended, which was induced at the end of the third month of pregnancy by an obstetrician of this city. After that the larynx yielded to treatment again and was practically healed within six months. This lady is still living—it is now four years—although she had an attack of pleurisy two years ago. She is feeling so well that she has not consulted a physician for one year.

Case 2 (No. 10 of my statistics). Mrs. N. consulted me while in the fourth month of pregnancy. For several weeks she had been hoarse and felt a constant irritation in her throat. The ary-epiglottic folds were swollen and injected, so were the ventricular bands. Right vocal cord serrated; t. b. c. of both apices; tubercle bacilli in the sputum. Immediate interruption of pregnancy was advised, and this was done within six days. Three weeks later the patient went to the mountains, where she stayed a year and a half. Since October, 1903, i. e., more than three years, she has been back in New York City enjoying comfortable health.

These two cases demonstrate that a cure, or, let us say, a relative cure, does occur after the induction of a premature labor. These women have been restored to their families and are able to enjoy life once more.

Similar was the experience of de Bruine Ploos van Amstel, who, in a very elaborate paper on "Phthisis pulmonum and abortus provocatus" (*Beitragte z. Klinik der Tub.*, Bd. 7, 1907), reaches the conclusion that the less far advanced tuberculosis is in a gravida the more urgent is the indication to interrupt pregnancy in the interest of the mother; in that way the possibility of saving a relatively healthy woman is the greatest.

Before laying down a general rule, however, in regard to the artificial interruption of pregnancy, I asked several prominent obstetricians of this city for their opinion. It is remarkable to note

how very few cases of laryngeal tuberculosis had been observed by these gentlemen in spite of their enormous experience in obstetrical work.

Thus, Dr. J. W. Markoe, in an experience of sixteen years at the Lying-In Hospital, during which time 49,000 women had been confined, does not recollect one such instance. The fact is that such cases consult the laryngologist rather than the obstetrician, and, furthermore, they are not admitted to hospitals.

Dr. J. Clifton Edgar remembers only one case that lived a short time after delivery at the fortieth week.

Dr. S. Marx reports the following cases:

Case 1. A well-known singer, pregnant in the third month, showed incipient pulmonary tuberculosis and "ulcerations in the larynx." Abortion was induced and the patient afterwards sent away. She is living now in this city in full possession of her health and voice. The abortion occurred six years ago.

Case 2. Young woman, very similarly affected as the former, died within six weeks after confinement at the regular time. Dr. Marx makes it a practice to induce abortion as early as he can.

Dr. J. B. Cragin writes: "In reply * * * would say that in the last 8,000 deliveries at the Sloane Hospital we have had 13 cases of tuberculosis, but in none of these was there any special laryngeal involvement. This may be accounted for by the fact that we do not usually take into the hospital cases with active tubercular inflammation. I remember delivering only one woman with marked laryngeal tuberculosis, and she died within a few months following her confinement."

All these colleagues, and a few more consulted by me, advise immediate interruption of pregnancy, if the case be seen early. If seen late, they generally wait in the interest of the child.

It seems to be the general opinion that the tubercular process is greatly stimulated by gestation and labor. Only Austin Flint, Jr., has seen a few cases improve during pregnancy "by ordinary anti-tubercular treatment." This we must consider as a decided exception, as it is not in accord with what others have observed. Still such cases ought to be recorded in full, if the above question is ever to be settled definitely.

In going over the literature, we come across several other cases improved during pregnancy and after delivery, even without any treatment whatsoever. It must be repeated, however, that in most of these it has not been proven satisfactorily that the laryngeal affection really was tuberculous. A slight swelling here or there

or a redness in a consumptive patient, while certainly to be treated with every care, is no positive symptom of laryngeal tuberculosis, and for that reason should not be considered an indication for the interruption of pregnancy. All of my cases were, unfortunately, of such advanced type that the diagnosis could not be doubted for a moment.

But is there nothing that can be done for such patients excepting the artificial interruption of pregnancy? The usual remedies that leave us in the lurch so often are even less reliable here. The disease makes rapid progress, and the only thing left to do in some instances is tracheotomy as an *indicatio vitalis*. Kuttner seems to think favorably of the latter, even as a means of cure in some cases. I am not so optimistic, but would rather reserve tracheotomy for such patients who present marked dyspnoea. Then it will be a life-saving means for the time and no more.

In all other cases, however, especially those showing a diffuse tubercular affection of the larynx, we have to fall back to an early interruption of pregnancy as the only means of saving the life of the mother.

There are some exceptions to this rule. If a woman is first seen at the end of pregnancy, then a few weeks make no difference, and it is best to wait in the interest of the child. Otherwise the life of the child can be regarded as a negligible factor, since it is lost, anyway, in almost every instance.

Furthermore, if the progress of the disease is so rapid that we are positive the mother will die shortly, then, too, it is useless to induce premature labor. But these cases should be weighed very carefully, since nothing is so surprising as irregularities in the course of tuberculosis. Patients sometimes recover in a marvelous way, while others succumb as unexpectedly.

The medico-legal side of this question has been ably discussed by K. and several prominent jurists abroad, but I do not feel inclined to enter into it here. It seems hardly possible that any judge in this or any other country would condemn a physician because he acted in the purest interest of his patient, of humanity, and often even to his own detriment, when he advocated an early interruption of pregnancy as the only possible salvation for the mother.

For that reason, it is so much the more our duty to be extremely careful in making a diagnosis and in advising our patients what to do in such a dilemma.

1003 Madison Avenue.

TUBERCULOSIS OF THE LARYNX AND PREGNANCY.

BY PROF. DR. A. KUTTNER, BERLIN, GERMANY.

It was just six years ago, on the occasion of the meeting of German Natural Scientists in Hamburg, that I called your attention to the extremely pernicious influence of pregnancy upon tuberculosis of the larynx. As the material at my disposal at that time was much too small to draw final conclusions from it, I published a request in several periodicals for the report of cases that would be likely to throw some light on the subject. This request met with gratifying response from many sides, so that as early as two years ago, at the time of the first meeting of the German Laryngological Society in Heidelberg, I was enabled to submit a report of about 100 critically examined cases. This is a considerable number when the relative rarity of such cases is considered and should be sufficient to furnish enlightenment on many points, though not on all. For notwithstanding the actually alarming similarity of outcome in most of these cases, the authors could not come to any agreement at that time, nor can they today, on the question which is really the most important, namely, whether and under what conditions tuberculosis of the larynx would indicate the advisability of interruption of pregnancy. On this account our Society, on the motion of the Chairman, requested me at the meeting in Heidelberg to furnish an introduction to a renewed discussion by preparing an article on this subject in collaboration with Dr. Löhnberg.

This new material, which has meanwhile been published, includes 231 cases, the histories of part of which are given in detail, whereas some authors as, for instance, Jurasz and Freudenthal, give a more summary account of their experiences. Of these 231 women an even 200 died during pregnancy or shortly after confinement; only in single cases, as in that reported by Lennhoff, did the patient survive confinement from six to nine months. But there is no doubt that in these cases also pregnancy formed the turning point in the fate of the patient; during this period the changes took place which were the beginning of the end.

Only 16 women passed this crisis safely; and 3 of these survived confinement only 1 to 1½ years. Induced abortion saved 9, induced premature birth in the seventh month, 1; tracheotomy preserved the life of 4, two of which died after about 1 to 1½ years. In this pic-

ture, composed of the experiences of various authors, gathered in various sections of the globe and under varying conditions, one record stands out as entirely different from the others, that of Barthas. He has collected 14 cases, of which, as he says, 7, that is 50 per cent, have survived confinement. These statistics contrast so markedly with the statements of the other authors and myself, which fix the mortality in the cases observed by us at about 90 per cent, that, if the estimation of mortality at 50 per cent be correct, all our previously drawn prognostic and therapeutic conclusions would be upset. The seriousness of the matter, where human lives are always at stake, demands a most careful examination of the presented material. The statistical compilation of a large number of single cases forms the only grading line for our therapeutic decisions, and erroneous premises would lead to conclusions involving the most deplorable consequences.

I would prefer to disregard the objection which has been raised that Barthas' cases are so few in number that accident might have played a considerable part. For even though only 7 out of 14 cases that actually belong to this statistical group have indeed passed through pregnancy and confinement satisfactorily, we would be obliged to revise our present opinion very thoroughly notwithstanding this small number. But after careful examination of Barthas' cases I have come to the conclusion that they, in contrast to the statements of the author himself, only serve to corroborate our view of the situation.

Of the 14 cases which Barthas reports, Nos. 1, 4, 7, 10 and 14 died, according to his own statements, directly or shortly after confinement; Case 10 was dismissed from the dispensary seven weeks after confinement in, as Barthas says, hopeless condition. Though further information concerning this patient is wanting, we are probably justified in assuming as beyond a doubt that she also died at the latest a few weeks after her dismissal. Accordingly we have 6 cases with fatal termination.

Of the remaining 8 cases, among whom, according to Barthas' calculation, 6 of the "surviving" patients are numbered, not one is of any value for our statistics, in my opinion. I am aware that what I am saying implies a severe criticism, but the importance of the matter demands uncompromising clearness.

According to Barthas' record, cases 2 and 9 have been examined only once in the fourth and seventh month respectively. What course pregnancy and birth have taken, what became of the mother

or the child in each case, is not known to the author. It is evident that both cases cannot be used for our statistics.

Quite similar are the circumstances in case 6. We learn that a tripara of twenty-years presented herself at the dispensary November 12th, 1903, somewhat hoarse. She stated that this hoarseness had commenced with the beginning of her last pregnancy. Examination revealed that the left vocal cord was infiltrated, especially in the most anterior part. Eighteen days later, on December 1st, these symptoms were somewhat more pronounced. ("The lesions have developed and the left cord appears thick and granular.") Here also not a word concerning further development of the case, no information telling us in what month of pregnancy the patient came to the dispensary, whether and when she was confined, how she stood the confinement, etc. How can this history possibly be used in the sense in which Barthas has used it? It is not even known whether the patient lived up to the time of confinement.

Case 3 was examined only once in the seventh month, and showed a slight infiltration of the vocal cords and the posterior wall of the larynx; the hoarseness had begun in the sixth month, the lungs seemed to be free. ("A little infiltration of the cords and of the interarytenoid region is seen. The apices appear free.") It will be conceded that this record is rather too insufficient to build a reliable diagnosis thereon. But even more important is the fact that nothing more is known of the further course of this history than that in a normal birth a normal child had come into the world. And here again not one word to indicate whether this assuredly very uncertain diagnosis has later been confirmed, nothing to inform us of the fate of mother and child, although, as we all know, just the time immediately following confinement is the most portentous. If our informants had also been satisfied with the information that the confinement had been normal, and had left off their observations at this point, then we would probably have a different, but surely not a correct impression of the matter.

Case 8 does not belong in these statistics at all, as the laryngeal affection began not during pregnancy, but after confinement.

In Case 5 the right apex was found "*en première période*." Hoarseness of a year's duration had increased since the third month of pregnancy. The larynx shows "a swelling of the arytenoid to the anterior face of which is attached a vegetation in the form of a papilloma almost completely filling the larynx," Notwithstanding this tumor which filled the larynx almost entirely, pregnancy and con-

finement took a normal course. Immediately after the confinement this tumor disappeared, seemingly without any treatment whatever, only a thickening in the posterior wall and hoarseness calling to mind the former condition. This case, also, does not belong to our statistics, to my thinking, for this is not a case of diffuse laryngeal tuberculosis, which we have made the subject of our discussions, but either a tuberculous tumor—and these are not malignant, as I have been able to prove on several occasions—or else the entire laryngeal affection was not of tuberculous nature at all, but only a sequela of impaired circulation, which we have so often occasion to observe during pregnancy, even in healthy women.

In Cases 12 and 13, the larynx had never been examined at all; furthermore, the observations were discontinued on the tenth and eighth day respectively. Who will guarantee to us that these women were not both dead fourteen days later? Apart from this, however, I must object against the classification of these two cases as tuberculosis of the larynx without any local examination. Barthas rests upon an authority like Dieulafois, who is of the opinion that so-called catarrhal laryngitis in tuberculous subjects is nearly always of a tuberculous nature. I readily admit that the diagnosis of catarrhal laryngitis in cases where tuberculous affection of the lungs exists, may quite often be erroneous owing to insufficient examination, and that the symptoms of inflammation in many such cases might be traced back to the invasion of tubercle bacilli, representing veritable tuberculous laryngitis. But it surely is not so in every case; it must not be forgotten that in many tuberculous subjects the upper air-passages are more susceptible than in healthy individuals, that under the influence of climatic conditions, of air filled with dust and smoke, strenuous use of the voice, and similar injurious agencies, very often symptoms of inflammation are produced that have nothing to do with tuberculous infection. On the basis of these reflections, I cannot permit two patients to be counted in our statistics as "surviving" in whom no tubercle bacilli were found, where the condition of the lungs had not even been definitely determined (Of one it is recorded: "The right apex is suspicious"), where no laryngoscopic examination has ever been made, where, in fact, the diagnosis is based only upon the evidence of hoarseness in the patient. To this must be added that in both cases observation was discontinued prematurely.

So we see that after detailed investigation Barthas' compilation presents quite a different aspect; for our statistics it does not give,

as Barthas says, 14 cases of which 7, that is 50 per cent, stood confinement well, but it contains only six cases that are at all to be used for our purposes, and of these 6 cases 5 died previous to or shortly after confinement, and the 6th was dismissed from the dispensary in a hopeless condition seven weeks after delivery.

In view of this post-examination of Barthas' report I must again point out, as I have already done in my previous communications, how great is the danger that the question bears a more favorable aspect in our statistical compilations than is warranted by facts and reality.

The reality of the cases of fatal termination, be it mother or child, cannot be disputed. In rare instances it may happen, as in Rosthorn's third case, that the direct cause of death is affection of the lungs rather than of the larynx. On the other hand, some cases may have been easily numbered among the "surviving" where observation was discontinued prematurely, or where, perhaps, the diagnosis was erroneous. And how easily can an erroneous diagnosis be made! We all know that often, even in perfectly healthy women, injection, swelling and oedema of the mucous membrane are evident during pregnancy, and they are absolutely harmless aside from their purely mechanical effects, usually disappearing after delivery without leaving a trace. How easy it is to erroneously diagnose such a laryngeal picture as tuberculosis of the larynx, if it be found in a tuberculous pregnant woman, thus giving us one more case of favorable termination!

Likewise Scanes Spicer, in a session of the London Laryngological Society, where Ch. Parker, H. Tilley, L. Lack and Cl. Beale reported one favorable case each, expressed his doubts regarding the correctness of the diagnosis. As I could not form a personal judgment from the very brief reports of these informants, I have entered all these cases under the head "favorable termination," even though our statistics may be made to appear more auspicious than conforms with reality. Aside from this, however, the remarks of Scanes Spicer and Felix Semon show beyond a doubt that our London colleagues are not inclined to be sanguine regarding the chances of such patients.

I must also refer briefly to a few statistics of Dr. Betz of Mainz. He was so kind as to place his observations of 9 new cases at my disposal, which, with the three that have already been published in my latest compilation, makes a total of 12 cases observed by him. The results obtained by Dr. Betz in single cases are extraordinarily

favorable. Of his 12 patients two were improved to such an extent that one lived one year and seven months, the other, three to four years after confinement. Three more women did not show signs of laryngeal affection until the last three to six weeks before delivery, and the symptoms had not developed very much in the short time preceding confinement, so that the one lived about one year longer while the two others are even now alive and in relatively good condition, 13 and 30 months respectively after delivery. In one case where affection of the larynx was in evidence as early as the second month, Dr. Betz was able to improve the conditions so far that the patient did not succumb to the tuberculous infection until after several years.

These statistics fit well into the frame of our previously formed conceptions, notwithstanding the relatively favorable results; they show that in occasional cases a patient that is almost despaired of may be saved by tracheotomy. They show further that a tuberculous affection of the larynx developing in the latter period of pregnancy is not so very formidable, also, that one among 12 women was so fortunate as to overcome the threatening danger by her own strength. It should be mentioned that this one as well as the other women who stood confinement well were in good circumstances, so that they could avoid every injurious influence, and in some cases await their time in health resorts under the best imaginable conditions.

As with the mothers, so are the conditions in the estimation of mortality of the children. Many a child is being counted as "living" that has been lost sight of a few days or weeks after birth, although it is a recognized fact that a large proportion of these children succumb in the first years of life due to want of vitality. And it stands to reason that even after the first years of childhood have been happily passed, the death-ratio will be relatively large, so that only a small fraction will reach adolescence.

But it seems to me that the principle which alone can form the theme of our discussions is not affected by an increase of one or two per cent in our statistics, be it favorable or otherwise. The compilation of the experiences which have so far been gathered by the different authors under widely differing conditions, and which are embodied in the 230 cases more or less; so far reported, proves beyond a doubt the enormous mortality (more than 90 per cent) in cases where diffuse laryngeal tuberculosis is complicated by pregnancy, and likewise, that the death-ratio of the children that are

born under these conditions is frightfully large, though not so large as that of the mothers. Even though, for obvious reasons, it is difficult to get reliable information concerning the mortality of these children, it is safe to assume that barely 30 to 40 per cent reach adolescence able to work. I would remind you once again that these figures are taken from among the less fortunate, from those classes of society where tuberculosis is endemic. Under favorable conditions, the prognosis for the mother is somewhat better, for child considerably so.

Since the new cases, as we have seen, serve only to corroborate the former experiences, the conclusions of most of the authors also proceed in about the same directions as the theses which I have laid down in my former articles on the subject. The following conclusions might meet with general approbation:

(1) The complication of laryngeal tuberculosis and pregnancy is of relatively rare occurrence.

(2) Diffuse tuberculosis of the larynx during pregnancy indicates a most unfavorable prognosis. The later the first symptoms appear, the better the prognosis, *cacteris paribus*.

(3) Infantile mortality is exceedingly great in cases where the mother has suffered from laryngeal tuberculosis during pregnancy.

(4) Among the wealthy, the prognosis for the mother is somewhat more favorable, for the child markedly so.

(5) Local and general therapie, as treatment in a sanatorium, may now and then meet with success, especially in mild cases. In a serious affection, however, such as is met with in by far the larger number of cases, the said termination of the disease is averted only very rarely by this means.

(6) Tubercular tumors of the larynx are relatively harmless and show no tendency to develop into a diffuse infection during pregnancy.

Up to this point, all authors are of one mind, so far as I can see. Another point, which heretofore has been doubtful, is brought into clear light by this new compilation. Even two years ago, when asked whether artificial interruption of pregnancy in cases where it is indicated actually gives back life and health to the patients, I was obliged to reply very modestly that only six such observations had been recorded, only three of which had met with the desired success. Since then, however, six more cases have been added, and also a report of an induced premature birth in the middle of the seventh month, which, I presume, might be counted in this connection, and

in all these seven cases the result was good. I know well that these figures are not overwhelming; but not one failure stands against these last seven successful attempts, and if of the 13 women whose pregnancy was interrupted 10 were saved, I believe it may safely be affirmed that only professional intervention saved the life of at least some of these patients. And if Dr. Pinard of Paris has said at the Congress of Gynecologists in Rome: "If there is a single fact which clearly shows that the premature expulsion of the product of conception has retarded the progress of the disease and the fatal termination I do not know of it," then he will, perhaps, acknowledge these figures as the "fact" which has been wanting, and revise his former opinion. Upon the whole, gentlemen, it seems to me that the chief import of our debate lies in the fact that we laryngologists more than others are called upon to take a leading part in the discussion concerning the justification of induced abortion in the different ailments. For in no other intercurrent disease, neither in tuberculosis of the lungs nor in affections of the heart or kidneys, do we find a death-ratio even approximately as large as in laryngeal tuberculosis, and in no other field, for this very reason, are the conditions so ascertainable and uniform.

First of all, however, we must ourselves be in accord on this point, and as yet the opinions differ widely concerning the question whether and under what conditions pregnancy in cases of diffuse laryngeal tuberculosis may be interrupted. In my previous expositions I have always been governed by the thought that in all our oral and written debates our endeavors would have to be simply to establish certain theoretical principles, an extract of the collected material, as it were, which would serve as an approximate guiding-line in our practice. To deduce a binding obligation for single cases from our statistics has been far from my intention. It is evident that here as in all similar situations each case demands individual diagnosis and, accordingly, individual treatment, which must occasionally depart from the general scheme.

I wish to be understood in this sense when I arrange in three divisions all the cases that concern us in this connection.

(1) The first division includes all those cases where every attempt to save the mother seems likely to meet with failure from the first. Here, of course, no one will think of inducing abortion, but the rather of delaying confinement as much as possible toward the normal termination of pregnancy, in the interest of the child.

(2) The second division contains all those cases where the laryngeal affection is so insignificant, and the general state of the

patient so favorable, that it is safe to infer that the woman will not be harmed irreparably by the continuation of pregnancy. I should not consider simple redness and swelling of the vocal cords, a moderate infiltration of the posterior wall, a slight loss of substance here and there, in other words, a circumscribed, altogether superficial tubercular infection, as a sufficient reason for the induction of abortion. Experience teaches us that such infection remains stationary in many cases. It is evident that these inconspicuous cases must be watched and treated with great care, as further encroachment of the infectious process may necessitate energetic intervention without loss of time. Likewise, matters are relatively favorable when the affection of the larynx develops toward the latter period of pregnancy. Even larger areas of infection, though they may cause considerable pain in deglutition, may be reduced after confinement if the general condition be propitious, as Betz's cases show, provided that the derangements caused by the laryngeal affection are not of too long duration. In this connection it must also be considered that in an affection during the last months of pregnancy the procedure to be decided upon would not be an abortion but a premature birth, and this, as is well known, taxes the powers of resistance in a woman's organism to a very great extent, so that all of the reported cases ended fatally, with one exception, and in that the foetus was of $6\frac{1}{2}$ months. Again, it happens now and then in a case where a serious affection of the larynx develops near the beginning or toward the middle of the period of gestation, that the patient improves so much after the termination of pregnancy that she lives for years afterwards in the enjoyment of her ordinary activities. For the report of such cases, proved beyond a doubt, we are indebted to Landgraf, Seiffert, Betz, and several others.

(3) The third division takes in those cases where laryngeal tuberculosis with a tendency to increase exists during the first half of pregnancy. Experience teaches us that such cases, as a rule, become so much worse during gestation that only an exceedingly small proportion (less than 10 per cent) survives the heavy strain of pregnancy and birth. In view of these facts, we must ask ourselves whether we are justified in the early interruption of gestation in these women when we are convinced that in the course of pregnancy they would succumb to the progressing laryngeal tuberculosis, while a premature interruption of gestation offers well-founded possibilities of a cure or at least of a gratifying improvement of their condition.

Hardly one of my colleagues, I believe, will refuse to agree to these propositions which are based on principle only and, therefore, somewhat theoretical. Even the law could not regard an abortion undertaken on account of such considerations as a criminal action, as I have shown in my last publication, though it may be conceded that a somewhat more exact wording would be desirable for the legal paragraph in question. That there are still people, here and there, as Freudenthal and I have shown, who from religious scruples take the standpoint that matters should be allowed to take their course in all things, who would rather see a mother die in agony without lifting a finger than sacrifice the child—that is certainly most deplorable, but our deliberations from the standpoint of duty cannot possibly be influenced by this evidence of ultraconservatism.

But our beautiful unanimity is at once broken when we attempt to put our theories into practice. If it could always be predicted with certainty that this patient will bear pregnancy and confinement well in her own strength, and that one will surely be lost without our intervention, then indeed it were easy to come to a decision. But the prognosis is so very difficult in these cases! It is so hard to say whether a patient will really be saved by means of premature interruption of pregnancy, and if she be saved, then again we are beset with doubt whether, perhaps, the same result might not have been attained without our intervention.

Here, and this is quite natural, everyone prefers to be guided by his own experience, be it ever so small. One has seen a case which took a favorable course against all expectation, and accordingly he is inclined to limit the indications for induced abortion as much as possible. Another saw a promising life, seemingly in perfect health up to the time of conception, waste away in a few weeks after the commencement of pregnancy, and he now demands most energetically the immediate interruption of pregnancy in every case where improvement is at all possible. Thus have the conclusions offered in my last discourse been attacked from different sides; this one considered them too moderate, that one too radical. And yet I believe to this day, after I have read all publications relating to this subject, studied again and again all plans that have been advanced and tested their foundations, that everyone must reach my other conclusions who contemplates the question as a whole irrespective of the changeful destinies in single instances. As we have seen in more than 200 cases, for women suffering from diffuse laryngeal tuberculosis the commencement of gestation is equal to a death warrant

in more than 90 per cent. But these women have a right to live, notwithstanding the fact that they are with child, and especially as more than half of the children born under such conditions die prematurely. And since induced interruption of pregnancy provides us with a means that is likely to avert the peril under definite presuppositions, I consider it our duty from a professional as well as a theoretical standpoint to recognize tuberculosis of the larynx during gestation as a sufficient indication to justify induced abortion under certain conditions.

This statement is certainly not intended to assert that in every single case not yet despaired of abortion should and must be induced. Such an assertion would be justifiable only if the mortality were 100 per cent. This, however, is not the case; instead, experience proves that in single instances the mother's life is saved without sacrificing the child, and for this reason it is our undeniable duty to look for this possibility and to preserve the life of mother and child if it can be done. I know how very difficult it is to do the right thing in every case; indeed, it would almost seem as though the rule is here that "the unexpected always happens." At one time we see a woman whose larynx is seriously affected at the beginning of gestation overcome all dangers contrary to expectation, and another time an affection which at its rise did not seem to be worthy of notice becomes threatening in the course of pregnancy, and what is worst, meanwhile the time that would have been of so much value has gone and the life entrusted to our care is hopelessly lost. Verily, gentlemen, a grave responsibility is laid on our shoulders. But when de Bruine Ploos van Amstel claims in his otherwise excellent dissertation that I do not make it easy to arrive at a decision, he is in error. Not I am the cause of these difficulties, they lie in the circumstances themselves; and to deny them or circumvent them by a general decree does not take them out of existence. To my thinking, it would be a grievous mistake if we should decree that, in view of the sad results of our statistical investigations, abortion shall be induced in every pregnant woman suffering from laryngeal tuberculosis, where the affection seems capable of improvement. We must not generalize, but individualize. Difficult as it may be, we must make an effort to save the child whenever the life of the mother can be preserved without interruption of pregnancy. The general health of the patient, the degree of her vigor, the results of examination of lungs and larynx, the history of her illness to date and the history of illness occurring among her blood-relations, also the

pecuniary circumstances of the patient, all these and many similar considerations must help us to come to a decision. I admit readily that in spite of all precautions and care, mistakes and disappointments will be our lot; but will they not also be experienced by those who either demand or reject abortion generally? And therefore, as I said in my last publication, I believe that we will best meet our professional and ethical obligations in this dubious position if we recognize tuberculosis of the larynx as a justifiable indication for interrupting gestation, with the restriction that it is only permissible when, under the circumstances, it offers the only means and at the same time a decided probability for the saving of the mother.

That it is our duty, under these conditions, to warn every woman suffering from laryngeal tuberculosis of the grave danger which is connected with pregnancy in her case, I have stated repeatedly. And as is proven by experience, not only those women are in danger whose larynx is in a state of active infection at the time, but even where the process has run its course and the larynx had been sound for years, it has been found quite frequently, though not in every case, that with the commencement of gestation the larynx became again diseased. We will also have to caution these patients to be extremely careful.

This thought has been expressed recently by Drs. E. Baumgarten of Budapest and Betz of Mainz in special communications to me. Dr. Baumgarten desires that, in view of the exceedingly sad conditions prevailing, the Deutsche Laryngologische Gesellschaft adopt a resolution and send it to all societies, associations, etc., that are interested in this question, to the end that enlightenment and information may be carried into the widest possible circles. For purely business reasons it has not been feasible for the Deutsche Laryngologische Gesellschaft to carry out this plan, although the proposition met with fullest approbation. Personally, I would have rejoiced if it had been possible to take up this motion of Dr. Baumgarten in an effective manner, for I know from my own experience that these facts, so familiar to us laryngologists, are but very little known at large. Dr. Betz, proceeding in the same line of reflection, advises tubal closure in endangered subjects to afford them effective protection.

Recently the question has been again much discussed why pregnancy has such especially unfavorable influence on the development of tubercular affections of the larynx. Barthas is of the opinion that here the physiological relation between the female genital apparatus and the larynx is a decisive factor. However, I do not

believe that this supposition is correct. Would we not have to expect a much more frequent affection of the larynx considering the large number of impregnated women with diseased lungs? Yet obstetricians with large practice affirm that tubercular affection of the larynx has been but very rarely observed by them among hundreds of pregnant consumptives. I believe, rather, that the alterations in the entire organism connected with every gestation, the changes in circulation and respiration, weakening in consequence of vomiting, insufficient nutrition, inadequate sleep, are to be considered as predisposing factors for the affection of the larynx; and if pregnancy has a deleterious effect in cases of laryngeal tuberculosis so much oftener than in any other disease, the reason is probably to be found solely in the local conditions of the infected area.

RESUME.

Of about 230 pregnant women suffering from diffuse laryngeal tuberculosis, three survived a natural confinement for one to one and one-half years, and thirteen for a longer period, in all sixteen, or seven or eight per cent.

Among these sixteen women are several in whom the laryngeal affection did not commence until the latter part of the period of gestation. Nearly all surviving subjects belonged to the wealthier classes.

Artificial abortion was induced in twelve cases; in nine with good results, in three without success. Induced premature birth was attempted in seven cases, in one (middle of the seventh month) with, in six without success.

Tracheotomy, or laryngo-fissure respectively, was performed fifteen times. Two of these women survived confinement one to one and one-half years, two still longer, while eleven died soon afterwards.

Of these 230 women about 200 died previous to or shortly after confinement, either without professional intervention or notwithstanding it.

Of 116 children concerning whom we have information, seventy-nine or eighty per cent are reported dead; eighteen as living at birth, or in the first two years; nineteen as living a longer time; in all thirty-seven or thirty-two per cent.

In wealthy families the mortality of the children was less than among the poor; likewise do the chances for the child seem better when the mother's life is saved.

Number	Name of Author	Publication	Number of		Induced Abortion		Induced Premature Birth		Tracheotomy or Laryngofiss.		Mother				Child			
			Reported Cases	Recorded Cases	Favorable	Died	Favorable	Died	Favorable	Died	Living	?	Died before or directly after birth	Died after some time	?	Living	Living at birth	Dead
1	Earlier cases collected by A. Kuttner.	Berl. klin. Wchschr. 1905, Nr. 29; Vrhdlg. d. D. laryng. Ges. 1905.	cir. 100	cir. 100	3	3		4	4	11	4		cir. 9			12	16	42
2	Pradella	J. D., Basel 1906.	3	3	2		1											
3	Frischbier	J. D., Freiburg i. B. 1906.	5	5									5					2
4	Felix	Annales des maladies de l'oreille, etc. 1906, no. 2.	2	2							1		1					
5	Freudenthal	Ztschr. f. Tuberkulose etc. Bd. XI, Heft 5.	26	26	2								24					24
6	Clifton, Edgar	Ibidem.	1	1									1					
7	Marx	Ibidem.	2	2	1								1					
8	Löhnberg ¹⁾	Private communication	4	3									3					3
9	Levinger ²⁾	Münch. med. Wchschr. 1906, Nr. 23.	2	2			1 ⁴⁾						1			1		1
10	"	Private communication	1	1									1					1
11	Betz ³⁾	Private communication	9	9							3		5	1		4	1	4
12	Reiche	Münch. med. Wchschr. 1905, Nr. 28.	9	9									9					
13	Cohn-Bromberg	Private communication	1	1									1					1
14	Kuttner, A.	Vrhdlg. d. Berl. laryng. Ges. 1905, 20. Jan.	1	1									1					1
15	Alexander	Ibidem.	1	1									1					
16	Ed. Meyer	Ibidem.	1	1			1											
17	Rosenberg, A.	Ibidem.	2	2									2					
18	Veit, J.	Therapie d. Gegenwart, 1906, p. 481.	3	3									3					
19	Lennhof	Vrhdlg. d. Berl. laryng. Ges. 1906.	1	1										1				
20	Ch. Parker H. Tilley L. Lack Cl. Beale	Intern. Centralbl. f. Laryngol. etc. 1906, p. 31 u. 32.	4	4							4							
21	Rosthorn ⁵⁾	Mtsschr. f. Geburtsh. u. Gynäk. Bd. 23, p. 581.	3	2									2					
22	Jurasz	Ibidem, p. 731.	37	37							1		36					
23	Koppe	Centralbl. f. Gynäk. 1887, p. 153.	1	1									1					
24	Lomer	Frauenarzt, 1904.	1	1									1					
25	H. W. Freund	Winckels Hdbch. d. Geburtsh. Bd. 2, Tl. 1, p. 596.	4	4	1								3					
26	Barthas, E.	Thèse de Paris, 1906.	14	6									5	1				
27	J. B. Cragin	s. Freudenthal, Nr. 5.	1	1									1					
28	Kollege K.	Ibidem.	1	1									1			1		
			240	230	9	3	1	6	4	11	13		199	3		19	18	79

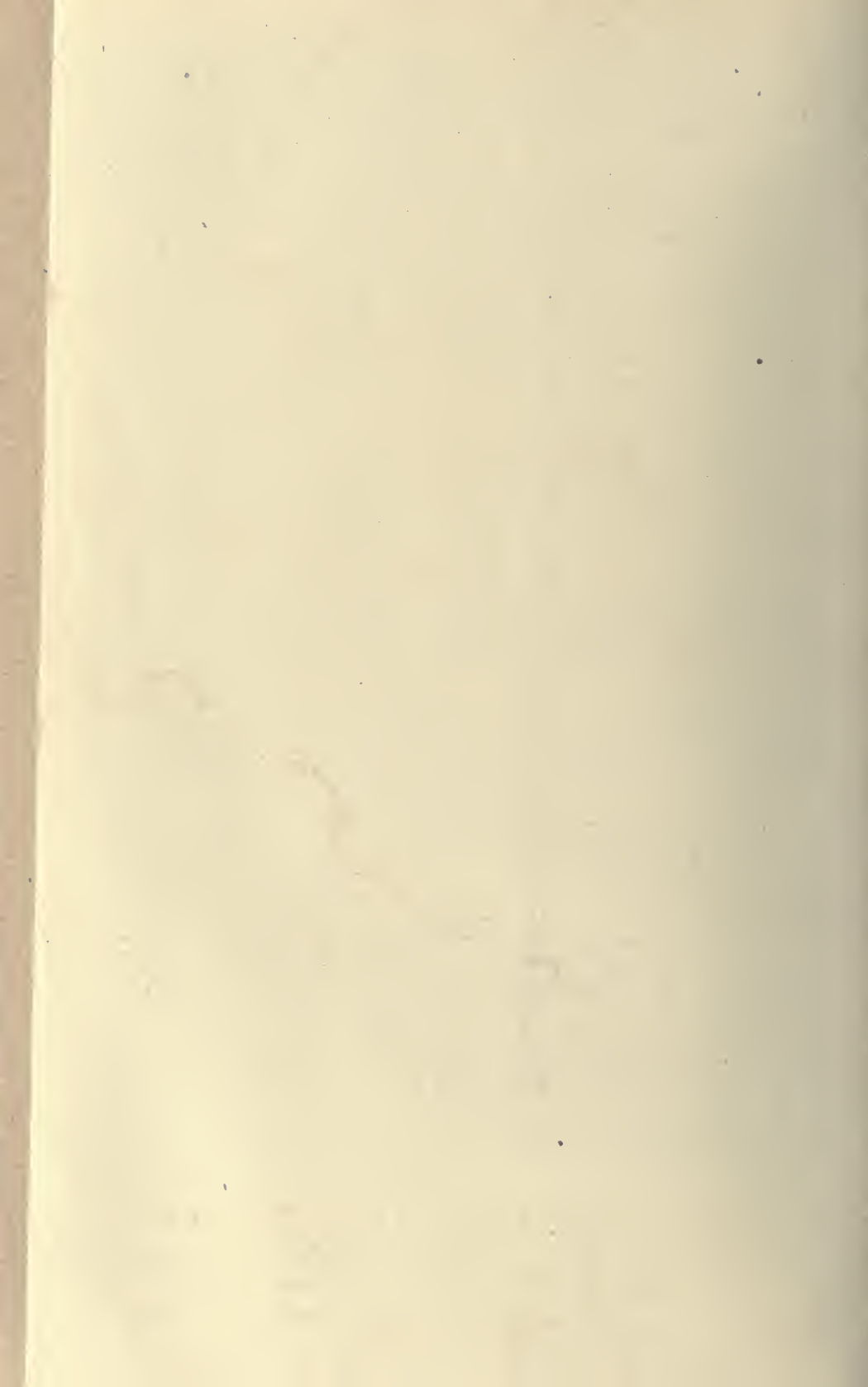
1. One case not under observation up to the time of confinement.

2. The death of the one patient was caused by a tuberculous laryngeal tumor.

3. Of the new cases reported by Betz, four have taken a very favorable course. (Three previous ones are mentioned in my last publication.) In three of the new cases the affection of the larynx developed in the eighth and ninth month respectively; these women were all of the wealthy classes.

4. In the middle of the seventh month.

5. In the third case, also dead, the larynx-diagnosis was doubtful.



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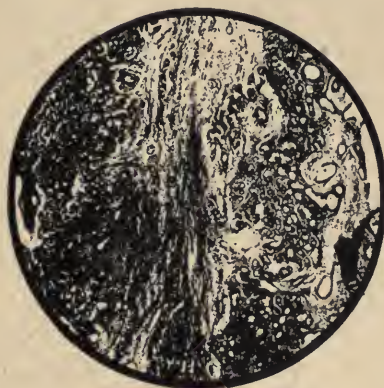
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W. Lutzoplatz 6.

HISTOLOGICAL EXAMINATION OF A WINDOW RESECTED SEPTUM.

BY JOSEPH C. BECK, M.D., CHICAGO, ILLINOIS.

A much mooted question in connection with the subject of this operation is, Does the cartilage and bone regenerate after the resection between the two muco-perichondrial flaps? Freer claims that it does, and his reason is purely from clinical observation of palpating by means of a probe. Carter makes a similar statement. Quain's Anatomy, on the regeneration of cartilage, says: "When a portion of cartilage is removed either surgically or by disease the regeneration is very slow. It depends much on the preservation of



the muco-periosteum and muco-perichondrium. Again the perfect adaptation of the two layers of perichondrium is essential."

This latter remark makes me believe that one should be very particular not to allow any accumulation of blood between the two layers.

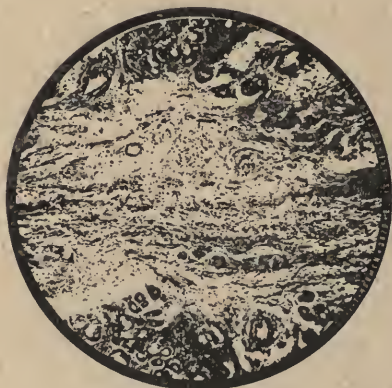
One of the best ways to prove whether it does regenerate or not is by histological examination, and it has been my fortune to obtain a specimen, post-mortem, of one of my cases operated on two and a half years ago.

HISTORY. Man, 49 years old, died of pneumonia two and a half years after his operation for deviated septum. I obtained a splendid

result at that time, with perfect union of the flaps, and practically no loss of mucous membrane.

POST-MORTEM. Excision of the whole thickness of the resected window of the septum: that is, the two layers of muco-perichondrium from beginning to end. This was hardened properly and prepared in the usual way in sections; also stained with hematoxylin eosin.

Figs. 1 and 2 show no trace of any cartilage or bone in the whole course of the specimen, with either high or low power. The section



shows a fairly normal mucous membrane on each side of a dense, well-organized layer of fibrous connective tissue in place of the resected bone and cartilage. The glandular elements of the mucous membrane are but little changed from the normal, a point of extreme interest in contrast to other methods of operating on the septum, as, for instance, saws, Asch, Gleason, and other operations.

1220 Clark Street.

An Attic Douche. J. THANISCH. *Monatschr. f. Ohrenh.*, Berlin, August, 1904.

The apparatus consists of a wash bottle, connected with an attic canula. The fluid is driven through the canula by compressing the air in the bottle by means of a hand-bulb.

(Note.—The identical apparatus was devised by Hewitt, and described in the *N. Y. Medical Journal*, April 15th, 1893.—Y.)

YANKAUER.

SOCIETY PROCEEDINGS.

NEW YORK ACADEMY OF MEDICINE.

SECTION ON LARYNGOLOGY AND RHINOLOGY.

Regular Meeting, October 23, 1907.

THOMAS J. HARRIS, M.D., Chairman.

PRESENTATION OF CASES.

A Case of Primary Epithelioma of the Maxillary Antrum, By
S. J. KOPETSKY, M. D.

To be published in full in a subsequent issue of THE LARYNGOSCOPE.

DISCUSSION.

DR. EMIL MAYER inquired whether Dr. Kopetsky had any reason to believe that the growth may not have sprung from the ethmoid. It seemed impossible that this patient could present so much diseased tissue within so short a space of time, especially as the history of most of these cases shows them to have had their origin further back than was at first suspected. Many years ago he had seen a young boy with a similar trouble involving both ethmoidal sinuses and extending into the nose. The patient bled profusely from the nose, and the rapidity with which the case progressed to a fatal termination was remarkable. An autopsy should be held in such cases wherever possible.

DR. W. W. CARTER said that last year he had showed before the Section a case of primary carcinoma of the inferior turbinate. A study of the statistics shows that these cases are much more rare than carcinoma of the accessory cavities of the nose. In many respects it had features identical with those of the case presented by Dr. Kopetsky. His patient was a woman thirty-eight years of age, while Dr. Kopetsky's case was a woman twenty-nine years of age. Here were two cases of deviation from the rule that carcinoma occurs only in the aged or those past 45 years of age. Another point is that pain is not one of the early symptoms of the disease unless the growth is confined between unyielding bony walls. If it occurs in the ethmoidal region the rule is that pain is an early symptom, otherwise it does not appear until necrosis of the bone begins or the growth is confined by the bony walls. Another point is that there

is very seldom glandular involvement when the carcinoma is confined to the nose; whereas when it begins in or spreads rapidly to the accessory cavities the glands become involved. The mortality in these cases is 100 per cent. At the time he had investigated the matter, there had not been reported a single case of recovery either with or without operation. In 1903, seventy-nine cases of primary carcinoma of the nose had been reported, and subsequent to this he had found records of 19 cases, making the total number to date 98. This included, no doubt, many cases of primary accessory sinus involvement. The cachexia in these cases is not marked. The course of the disease is so rapid that before the patient becomes cachectic he dies. At the time he reported his case, it was three months after the operation and absolutely the only part involved was the anterior third of the turbinate. It was thought that all of the diseased tissue had been removed and that if any case could be cured by operation this was one. Three months after operation there was no recurrence, but a month later (Dr. Carter said he wished this to be accepted as a supplementary report) the patient returned with a recurrence of the growth. Upon examination it was found that the anterior nasal cavity was filled with a cauliflower-like mass which extended to the ethmoidal region. The post-nasal space was also filled. The growth was very extensive and its development had been very rapid during that month. Only a palliative operation could be done, and the patient died twelve months after the incipency of the disease.

DR. LEDERMAN told of a case of small round-celled sarcoma which he had presented before the Section some years ago, the first case upon which the Dawbarn method of excising and ligating the carotids had been performed. Up to last spring the patient was still alive. The operation had been performed nine or ten years ago. He had tried a few injections of the Coley fluid at that time, but the pain and reaction were so severe the patient asked that this treatment be stopped. The external carotid was first ligated at the right side, and nothing further was attempted for the time being. It was surprising to see the diminution of the growth after an interval of two months. The remaining mass still persisted, however, and later Dr. Dawbarn did a resection of the superior maxilla after ligating the external carotid on the left side. The patient made a good recovery and is still alive.

THE CHAIRMAN said that both previous speakers had called attention to the fact that the Sarcoma was less malignant in character than the Epithelioma.

Scleroma of the Pharynx. By EMIL MAYER, M. D.

This patient is a young woman aged 23 years, born in Minsk, Lithuanian Poland, has been three and a half years in this country, and claims that her trouble is but of one year's duration.

She first presented herself at the clinic of the speaker at Mt. Sinai Hospital. Her history was very meager and she had ulceration and destruction of the soft palate and some intranasal growth anterior to the inferior turbinates on both sides. This latter was not enough to occlude the nares and she did not complain of the nose. There was a white scar on her right cornea which she said was due to an injury in childhood.

The diagnosis made by Dr. Mayer was Congenital Syphilis, and Potassium Iodide was given. Six weeks later she appeared, and not having been benefited by the treatment, his assistant, Dr. M. J. Ballin, suspecting Scleroma, removed a piece from the soft palate, which the pathologist promptly reported as due to the bacillus of Rhinoscleroma.

The advanced condition of her pharynx with the slight intranasal involvement points strongly to its having originated in the soft palate and makes the case unique in this respect. There is no external involvement of her nose and the larynx is entirely free.

The whole condition has decidedly improved since her first appearance due to the X-ray treatment instituted by Dr. Stern in Dr. Lustgarten's clinic.

This patient, like all the others here recorded, comes from the district where Rhinoscleroma is endemic, and the element of contagiousness of this disease is discussed, as it would be necessary to decide whether such cases might not properly be excluded from this country.

One gratifying feature is the wonderful results obtained from the use of the X-rays.

DISCUSSION.

DR. VOISLAWSKY said that during the summer he had had a case of Rhinoscleroma. The woman came from Austrian Poland. He had seen two or three patients who had been exhibited before the Section at various times, and had been impressed with the fact that the patients seemed to be somewhat deficient mentally. He would like to know whether Dr. Mayer had noticed this characteristic in any of his cases.

THE CHAIRMAN said that in this country at least the condition was still a rare one, and it would be well to discuss the subject at

length. Dr. Freudenthal had had two or three cases, also Dr. Toeplitz, and perhaps others in the Section.

DR. FREUDENTHAL said that he had now under treatment a very unique case in a child nine years of age, who had an obstruction of the nose since the mother can remember. The left ala nasi felt very hard to the touch, causing him to immediately suspect Rhinoscleroma. A portion of the inferior turbinates was removed, and a diagnosis of Rhinoscleroma was made. The child had been sent to Dr. Stern at Mt. Sinai for X-ray treatment, but there was no result from it, although only four sittings had been given. He had removed part of the very much thickened septum, and the child can breathe much better now. Dr. Freudenthal thought that that was the youngest case on record.

DR. MAYER, replying to Dr. Voislavsky's inquiry, said that he had not observed any mental deficiency in the patients he had seen. They seemed to be quite the equal of the same grade of our own countrymen. They do not understand our language nor we theirs, and that is probably where the trouble lies. With the aid of a good interpreter they understand fully and are sometimes remarkably bright. The patient who came from Austrian Poland would be included in the radius of the affected district. He had never seen a case in this country nor from any place far away from that centre. It does not seem to be very unusual in young children in the habitat of the disease. One writer mentions two babies so afflicted, and another tells of two sisters having the disease, both children. In his own cases, so far as he could gather, none of the other members of the family had been similarly affected.

In response to an inquiry from Dr. Harris, Dr. Mayer said that so far as he could gather the total number of cases reported in this country was probably not over a dozen. The same case would probably be reported in a number of instances. Dr. Toeplitz' case and Dr. Freudenthal's case had been reported by several dermatologists, and the same patients wander around from one clinic to another. A case that had appeared in his own clinic had been reported by Dr. Ballen. He (Dr. Mayer) also showed the same patient in societies and in that way the same case is mentioned often. On the other hand, some cases are unrecognized.

A Case of Cleft Palate. By JOSEPH H. ABRAHAM, M. D.

A. K., aged 18. Born in England. Mother living and well. Father died a year and a half ago from pneumonia. Six children all well and free from any deformity. This patient was operated

upon eight years ago for cleft palate, but the operation proved a failure. At present she complains of being unable to breathe through her nose, throat very dry, and frequent desire to cough.

Examination:—A cleft situated in the median line, somewhat elliptical in shape, extending from the hard palate backward through the middle of the soft palate and uvula. The interesting pathologic lesions are the uncommon posterior ends of the inferior turbinates blocking the posterior choanae and touching in the median line and adenoid hypertrophies. The mucous membrane of the posterior pharyngeal wall is atrophied, with adhering and dried mucus. The posterior turbinates and adenoids will be operated upon, and later an attempt will be made to close the cleft palate.

DISCUSSION.

DR. CARTER said that Dr. Abraham had emphasized that it was a very unusual hypertrophy of the ends of the posterior turbinate, but he had noticed in cases of cleft palate that had reached the age of Dr. Abraham's patient that there is always a considerable amount of hypertrophy of the posterior ends of the turbinates. He believed that this was an effort of Nature to accommodate herself to the imperfect structural conditions and to prevent the regurgitation of food through the nose.

DR. MACKENTY told of a case of hypertrophy of the posterior turbinates in connection with a case of cleft palate, where the hypertrophy almost fills the nasopharynx—so much so that the man can swallow very well. It produces an obstruction that almost compensates for the loss of the palate. The question had been raised as to whether it was wise to remove the mass, and it was decided that it would be best to wait until the palate was restored and then remove only so much as seemed necessary.

The case he had wished to show tonight represented the third attempt at closure of the soft palate. There was very little tissue to work upon. The edges of the wound were pared in an oblique way so as to increase the surface contract, and the muscles of the soft palate were all divided completely at their origins without dividing the mucous membrane more than was necessary. Then silver wire stitches were put in. An important point in this operation is to avoid tying the stitches too tight. Allowance must be made for swelling after the operation. Contact without constriction is to be aimed at. The after treatment in these cases consists of frequent cleansing with peroxide (1 in 4 or 5) every two hours during the

day, then with normal salt solution. The parts must be kept as clean as possible. In this case, perfect union was secured.

The tongue was dissected back from the floor of the mouth to an extent necessary to let the tip reach the palate. This step he considers very necessary in all cases where the tip of the tongue is short, since unless the tip of the tongue can reach the teeth and hard palate correct speech is impossible.

A Case of Sarcoma of the Tonsil and Base of the Tongue Treated with Radium. Cure. By W. FREUDENTHAL, M. D.

Man of 48 years of age. Family and personal history both negative. No history of venereal disease. Nine months ago first noticed a swelling of the throat, and later had some difficulty in swallowing. The swelling apparently grew larger and he applied to the dispensary for treatment. Examination revealed a tumor extending from the right tonsil to the median line along the base of the tongue. The mass was hard and bled very easily. Although no signs of syphilis could be found, still he was given K. I. in increasing doses and treated with inunctions. At the same time a small piece of the growth was removed from the tonsil, and the pathologist reported it to be sarcoma. What was to be done was the question. All my previous cases of sarcoma of the tonsil had died shortly after operation, and consequently I was not very anxious to operate in this instance, nor did the patient desire it. The anti-specific treatment instead of helping, seemed rather to stimulate the growth, and the mass was nearly three times as large as when treatment was commenced. The only thing that remained was to try radium. Ten milligrams of radium of 1,000,000 strength was applied, the first exposure lasting ten minutes, and subsequent ones twenty or twenty-five minutes. The exposures must be carefully timed in the pharynx and more so in the larynx, or they may result in oedema. The patient came to the clinic twice a week and immediately after the second or third treatment the mass began to break down and grow smaller. After the fifth or sixth treatment the mass disappeared entirely, leaving the throat as you see it tonight. It is a very remarkable case. Another piece was removed from the mass for examination before the application of radium, and this was sent to Dr. Jonathan Wright, who pronounced it sarcoma, of the rapid growing round-cell type, infrequently seen in the larynx. "Without a history and supposing it to come from the larynx where sarcoma is rare, I leaned to the idea of syphilis, but a more careful examination leads me to believe it sarcomatous."

Dr. Freudenthal said that he studied the case with four assistants, and many of his colleagues saw the patient, and it was truly remarkable to see how the growth melted away under the radium. There is now no sign of sarcomatous tissue.

In reply to a query as to how long since the growth disappeared, Dr. Freudenthal said that it was now about four months.

DISCUSSION.

DR. PHILLIPS said that two or three years ago a tube of radium had been placed in his hands for experimentation with the emanations. It was used for some time very carefully, Dr. Kopetsky carrying on the experiments, but when the results were published there was no case of any kind wherein radium had been used in the larynx, pharynx, or middle ear with any beneficial results. His experience and observations with electricity and radium in any form, had led him to become sceptical as to any good resulting from these methods.

DR. EMIL MAYER said that it was not to be denied that the most successful reports of the use of radium have come to us from men whom we must believe, for they cannot have been mistaken every time. There must be some explanation of the diversity of opinion regarding the success or failure of the radium treatment. Perhaps some of the failures might be accounted for by the quality of the radium tubes used.

In the speaker's knowledge, no good results had been obtained.

DR. PHILLIPS replied that his tubes had been furnished by the firm supposed to own the finest supply of radium in America.

DR. KOPETSKY said that experiments to which Dr. Phillips had referred were carried on upon all kinds of small new growths, especially in the ear. The tubes were introduced into suppurating ears with granulating polyps, and tried thoroughly, but the polyps remained just the same, no change of any sort being noticeable from the use of the radium. In the nose it had no effect at all; and granulations in the larynx were also found unaffected. Dr. Kopetsky said that he had also tried the effect of radium upon various cultures of bacteria in the laboratory. The radium did not seem to affect the germ growth on culture in any perceptible manner.

THE CHAIRMAN spoke of a case reported by Dr. Wilson of Bridgeport of sarcoma or possibly epithelioma of the auditory canal which was cured with four or five applications of radium. His last report, made six months or a year ago, stated that the growth had

returned since the first report, but had again disappeared after one or two applications of radium.

DR. SEYMOUR OPPENHEIMER said that there certainly seemed to be a great diversity of opinion in regard to the value of radium in malignant disease. Probably the reason for some of the bad results lay in the fact that it was used upon non-operative cases, cases declared to be such by the surgeon, and the radium was used as a forlorn hope. He had known of three cases where radium was employed, in all unsuccessfully. Two of them had been treated by Dr. Morton, who was one of the most experienced men using it. One was a case of involvement of the floor of the mouth, and a third was a case of malignant growth of the tonsil. The last named case resulted tragically. The patient used the tube himself, inserting it in a fistulous tract existing in the neck. Considerable difficulty existed in opening the jaws wide enough to take food, but immediately after using the tube in the fistulous opening he could open his mouth readily. It was his delight to show his medical advisers the wonderful results of the tube upon the ankylosis. One day, however, in showing off what the tube could do, he pushed it into his carotid artery, which had evidently become eroded—a big gush of blood followed and the patient died, a martyr to science.

DR. FREUDENTHAL said that the radium he employs is no better than that used by others, and in fact came from the same place as that used by Dr. Phillips. He did not know what effect it has upon granulating polyps or on sarcomata in general, but the results obtained by Dr. Abbe, Dr. Wilson and himself he knew were real. In his own case the diagnosis was made by two different men. The growth was there, and disappeared after the application of radium—the total time of application being one and one-half to two hours. He could not say whether or not he would have the same success in another case. He recalled a case of epithelioma of the larynx and oesophagus in a lady 68 years of age. The radium was applied to the oesophagus and the patient could swallow. Soon afterward, however, she died, so there was no permanent effect produced by the radium. What the ultimate effect will be in all cases cannot yet be said. It is only by much larger clinical experience that we can determine its full merits.

Case of Gumma of the Larynx with Necrosis of Right Arytenoid.

By HARMON SMITH, M. D.

To be published in full in a subsequent issue of THE LARYNGOSCOPE.

DISCUSSION.

THE CHAIRMAN called attention to the fact that in Dr. Smith's case no result was reached by the Potassium iodide treatment until the patient was taking the enormous dose of 180 grains three times a day.

DR. SMITH said that he would report again on the case later. He did not think the necrosis was at an end, but expected further cicatrization within the necrotic area. It was a question as to whether it would not have hastened the recovery to have entered the larynx externally and scraped out all the necrotic tissue. This might have prevented a great deal of the cicatrization which will naturally occur as time goes on. He would be very glad to have this question brought out in the discussion.

DR. THURBER said that the worst case of gumma of the larynx that he had ever seen was in a woman 26 years of age, and in her case a small ten-year-old sized intubation tube was put in the larynx. It was taken out at intervals to see if she could do without it. As the growth shrank under the Potassium iodide treatment, the tube could be taken out.

DR. MEIERHOF said that in his experience surgeons had great objections to performing operations during syphilitic activity, unless life was in jeopardy.

Report of a Case of Tubercular Laryngitis and Three Cases of Benign Laryngeal Neoplasms. By T. J. Harris, M. D.

The first case is a case of Laryngeal Tuberculosis which I present because of the doubt which has existed up to a short time ago in reference to the diagnosis. The man, D. C., is 50 years old and was referred to me by his family physician, who stated that he had treated him for some affection of the liver. At that time there were two distinct areas of ulceration upon the epiglottis, one on the lingual and one on the laryngeal surface. The patient was in good general health and only complained of pains in his throat. Acting upon the report of the family physician, although the patient denied lues, I put him upon iodide of potassium with Mercurial injections, and the condition in the throat began to at once improve, and the patient stated that all pain had disappeared. I did not see him for a number of weeks until my return from my vacation. At that time, three weeks ago, I again saw him and found the condition of his larynx much as it appears tonight. At this time, I began to question my diagnosis, although there was no real relapse. He

was submitted to a physical examination which, of course, should have been done on his first visit, and an infiltrated area was discovered at the apex of the right lung. A solitary tubercle bacillus was found in the sputum. His temperature was on that occasion 99.2 degrees and his pulse 110.

This case illustrates the repeated observation of us all, of the necessity of a general examination in all such cases as well as the fallacy of the so-called therapeutic test to prove or disprove the presence of lues.

The histories of the three Laryngeal cases are as follows:

Case 1. J. B., aged 21, presented himself last July complaining of hoarseness, especially upon forced use of the voice. Examination showed a sessile growth, dark red in color, attached to the inferior border of the left vocal cord at its middle and anterior third, three millimeters in length. A clinical diagnosis of fibroma was made, and the growth was removed without difficulty by means of the Spiess forceps, which I take the opportunity of presenting. The instrument is undoubtedly known to most of you here, but it is possible that some of you have not had the opportunity of using it and thus satisfying yourselves of the great steadiness secured in its manipulations by means of the trigger handle.

The report of the pathologist was that of hyperplastic epithelium and a small bit of fibrous sub-connective tissue. Not being a pathologist, I am unable to say whether this differs from a true neoplasm, and wish that Dr. Wright were here to explain it. Certainly clinically, it had every ear mark of such a growth. Its removal at once restored the voice of the patient.

Case II., K. B., aged 29, married, always in good health; for the last nine months has suffered from impaired voice until at present, she is entirely aphonic. There is no evidence of lues, temperature 98.4 degrees; pulse 88. Examination of the larynx shows a wart-like mass filling the anterior commissure. This is attached to the right cord and false cord anteriorly, as well as the left cord opposite. The sputum of the patient has not been examined, but her chest does not give any evidences of tuberculosis. The clinical appearance is one of a papilloma. Either simple or tubercular in nature. At a subsequent meeting I shall give microscopic findings.

Case III, aged 35, a cigar maker, was seen by me last week for the first time. He complains only of hoarseness, varying in intensity. Examination of the larynx shows upon expiration a semi-translucent pedunculated growth, springing from the surface of

the right vocal cord in its anterior portion. Clinically the case is one of a polyp of the vocal cord usually described as a myxoma.

DISCUSSION.

DR. EMIL MAYER said that the cases were too interesting to be passed over without comment. The case of the young woman is especially interesting in regard to the possible origin and character of the mass. He hoped that the Chairman would later present a report on the findings after the removal of the growth. There is no question of the diagnosis in this case or the one with a subcordal growth, nor in the case of tubercular ulceration.

In response to an inquiry from Dr. Mayer, Dr. Harris stated that in the last named case one tubercle bacillus was found. Dr. Mayer said that that was especially interesting, for there was no marked pulmonary involvement. The condition of the man's epiglottis was very peculiar, and presented quite a picture of lupus, and to find only a single bacillus in a case of so much ulceration would point to that possibility, especially as his physical condition was so good. He is free from all signs of general tuberculosis. If it should prove to be a case of lupus it would make a great difference in the ultimate prognosis of the case. Cases of lupus have been known to last for 18 years before going to pieces with tuberculosis; in another instance a case lasted 7 or 8 years, and in another still longer. He hoped the Chairman would try whether a more careful and thorough examination with this in view might not enable him to tell his patient that although the condition was undoubtedly tuberculosis, yet it was one of very slow action.

THE CHAIRMAN responded that he had this idea in view in presenting the case and was hoping that Dr. Mayer would make just such a reference as he had made, and he would be very glad to carry out his suggestions.

DR. CHAMBERS said that this case reminded him of one in which he and Dr. Freudenthal removed the epiglottis about five years ago. Some one had asked him tonight if he had made out this case to be a tuberculous one, but he could not say that he did, although if Dr. Harris had so diagnosed it, he must be right. It reminded him very strongly of the lupus case which he had seen some years before.

THE CHAIRMAN said that the two cases which were presented tonight with the neoplasms untouched were shown with the idea of bringing out a discussion of the diagnosis. The case of the young woman appeared to be a true papilloma, but it was possibly

a simulating papilloma, tubercular in nature. Such a case could very properly be removed by direct laryngoscopy.

THE CHAIRMAN responded that he would bear in mind the suggestions that had been offered, and hoped to make a further report on the case of the young woman later.

Case of Thyroidectomy for Graves Disease. By J. E. MACKENTY, M. D.

The patient, Mary McK., had the ordinary diseases of childhood, excepting scarlet fever; also malaria. Nervous temperament. Subject to indigestion, epigastric fullness, and bloating. Since childhood she has had considerable headaches, the pain being frontal, severe, and lasting from half a day to a day and a half—occurring about once a week and occasionally accompanied by vomiting (migrainous). No family history of thyroid disease. Two years ago, she noticed a rapidly increasing growth in the thyroid region, which may have been there for some time before her attention was called to it.

The growth was large, bilateral, nodular, cystic, affecting the whole gland, and extending into the sternal notch, and laterally more on the right side. Pathological examination showed the growth to be cystic. The patient was operated upon June 27 and made an uneventful recovery. Drainage was employed for 15 days. There was a paresis of the left vocal cord but no loss of voice. This is now almost normal. The cosmetic result is excellent. The symptomatic cure is even more satisfactory. Prior to the operation she suffered from exophthalmos, tachycardia, palpitation, nervousness, muscular tremor, occasional generalized pains, muscular weakness, insomnia, severe headaches, vertigo and unrest, indigestion, emaciation, and a good deal of vesical irritability. The tachycardia, nervousness, and palpitation are improved; the muscular tremor is practically gone; the pronounced muscular weakness is also gone, and she can now walk a reasonable distance without fatigue; exophthalmia and the generalized pains have disappeared, she no longer suffers from insomnia, has had no headache or vertigo since the operation, has gained eight pounds in weight. The vesical irritability is still present and she still suffers more or less from indigestion.

DISCUSSION.

DR. LEDERMAN inquired whether Dr. Mackenty had tried any of the thyroid extracts, thyroidectine, etc.

THE CHAIRMAN said that a colleague had performed the operation now upon eleven cases—not complete, but leaving some of the gland, without any thyroid symptoms. There was no death in the series from the operation, though in one instance he had been called to operate upon a dying woman.

DR. MACKENTY responded that he had used no thyroid treatment in the case, as it did not seem to be indicated. The growth was of a cystic nature, and the thyroid treatment would seem to apply more to cases of parenchymatous enlargement. Nothing, in his opinion, would relieve cystic degeneration excepting the knife. He had presented the case more to show the excellent cosmetic results than for any other purpose.

EXHIBITION OF SPECIMENS.

Foreign Body Removed from the Bronchus. By SINDEY YANKAUER, M. D.

Dr. Yankauer said that in August he had been called to see a boy five years of age with the following history: Six weeks previously the child had been eating peanuts and had swallowed or inhaled a portion of the kernel. This was followed by a spell of spasmodic coughing which disappeared after half an hour. There were no further symptoms, but the following day and every day thereafter there were attacks of coughing, like attacks of whooping cough. At the time of his visit the boy was running about and did not seem to be incommoded in any way, but had one spell of coughing. Examination of the chest revealed many dry and moist rales. On the following day the boy was anaesthetized and a bronchoscope seven mm. in diameter was passed through the larynx. When it reached the bifurcation, the foreign body was seen in the right bronchus. It was seized and a small piece was removed. The forceps were introduced a second time and a larger piece was removed; a third attempt brought away half of the remainder, and the rest was coughed up through the tube. The tube was then withdrawn. The time from the beginning of the anaesthesia in the bedroom, to the removal of the foreign body, was fifteen minutes.

There were two interesting points in connection with this case: First, the foreign body was removed through the natural passages. Quite a number of specimens of foreign bodies removed from the bronchus have been presented before the Section during the last two years, but in all of them the foreign body was removed through a tracheotomy wound, though in some the tube could be passed

through the natural passages. In this case, it was removed without difficulty through the larynx. In spite of the fact that the boy was only five years of age, the manipulation was performed without any injury. There was no hoarseness, no pain, and no laryngeal symptoms of any kind, and he made a good recovery. The second point of interest lay in the fact that the foreign body was a peanut kernel, as kernels or any vegetable matter are particularly dangerous; the most dangerous of all is the bean, but the peanut does not seem to swell up and become as soft as some of the other kernels do.

Nasal Polypi attached to Ethmoid Cell. By N. L. WILSON, M.D.

This specimen was presented to show that the removal of a polypus is not without danger. The polypus was engaged well up at the base, and only ordinary traction was employed, but nevertheless the ethmoid cells came away with the polypus. The patient, however, made a good recovery.

Tubercular Ulceration of the Tongue. By W. FREUDENTHAL, M.D.

The patient from whom this specimen had been removed had been presented by me last winter before another society on account of a small neoplasm on the tip of the tongue. It was not possible at the time to have a microscopic examination made, as the patient was too timid to allow us to remove a piece. Several of those who saw the patient thought that it was a malignant growth. The patient shortly afterward, however, developed tuberculosis of the larynx and was sent to the Montifiore Home. There the mass broke down very soon, and a marked ulceration developed. Patient died during the summer and half of the tongue was removed. The specimen is so exceptionally nice, that I thought it might interest you.

EXHIBITION OF INSTRUMENTS.

Handle of a Laryngeal Forceps. By T. J. HARRIS, M. D.

This was devised by Prof. Spiess of Frankfurt, Germany.

Nasal Snare. By W. H. HASKIN, M. D.

Dr. Haskin said that he had found this snare in Paris during the summer, and while it was faulty in that it was not sufficiently strong it was very useful in that it allows the loop to be placed at any desired angle, draws and cuts at the same time. After adjustment the loop will always assume the same angle on being released from the stylet.

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY.

Regular Meeting, October 8, 1907.

J. HOLINGER, M.D., President.

A Case of Laryngeal Stenosis. By J. T. CAMPBELL, M. D.

DISCUSSION.

DR. E. FLETCHER INGALS: A cursory examination of the case leads me to believe that it is one of tuberculosis. The uniformity of the swelling on both sides militates against malignancy. The fact that iodides did not improve the patient eliminates syphilis and the fact that the iodides made the patient feel worse points toward tuberculosis. Eliminating the history given, I think every one would consider this a case of tuberculosis. The fact that no tubercle bacilli have been found would not militate against that diagnosis, because very often we fail to find bacilli in laryngeal tuberculosis.

DR. O. T. FREER: In my opinion the anatomical conditions in Dr. Campbell's case indicate perichondritis of the cricoid cartilage, involving both its posterior and anterior portions. The smooth, edematous enlargement of the posterior wall of the larynx, bulging into the laryngo-pharynx, and the symmetrical subglottic swellings that meet in the centre below the cords are typical of this affection. On one side the inflammatory process has caused a fixation of the cricoarytenoid joint, while the other is still movable.

Chronic perichondritis of the cricoid cartilage has many causes and as Dr. Ingals suggests, it may be of tubercular origin in this instance. I recall two cases from my experience which were traumatic. In the first, the disease followed a laryngotomy performed by me for the removal of a sarcoma of the cord and until I lost sight of the patient the condition created a total closure of the laryngeal lumen. In the second case, the perichondritis was maintained by the prolonged wearing of a tracheotomy tube, which had been inserted too high, after division of the cricoid cartilage in front, the larynx being completely filled by the swelling in this instance.

As to the cause of the condition in Dr. Campbell's patient, it seems to me that it can not be determined without further observation of the case.

DR. A. W. BAER: I would like to ask Dr. Campbell whether he has tried the interrupted galvanic current?

DR. CAMPBELL: No, I have not.

DR. BAER: I am sure that nothing would give the patient more relief and better results in the case than electricity.

DR. GEORGE E. SHAMBAUGH: I saw this patient a few days ago, and the findings described by Dr. Campbell agree with those I found. I think that an intralaryngeal incision might be of some benefit to the patient.

DR. HOLINGER: I do not believe that this is a case of malignant growth, because there is an absence of swelling in the glands of the neck. I agree with Dr. Ingals that it is tubercular, and suggest ignipuncture. The procedure is not painful if the area is well cocaineized, and is exceedingly valuable.

DR. J. T. CAMPBELL (closing the discussion): These things have all been considered. Dr. Hardie and Dr. Morgenthau saw the man with me and we were unable to make a positive diagnosis. I think that trypsin has done much good in this case. This man has gained 41 lbs. in weight and this gain agrees with the results usually obtained by the use of trypsin. The man I showed here a year ago has since died and carcinomatous involvement of the base of the tongue and the glands of the neck was found.

Some Points in the Surgery of the Sphenoid Sinus. By A. H. ANDREWS, M. D.

DISCUSSION.

DR. F. E. BRAWLEY: I believe that the curvature Dr. Andrews gives his probe is a real advance in the diagnosis of diseases of the sphenoid sinus. I think that his objection to removing at least a portion of the middle turbinal may be questioned, because the original sphenoid disease depends to a great extent on stenosis in this region. There are hypertrophies of the middle turbinal which close the channel in the nose, thus preventing proper aeration and reducing the vitality of the tissues. There is no objection to removing at least the posterior half or third of the middle turbinal, so that the ostium can be reached directly. I have used this probe in two cases. I was successful in one, and unsuccessful in the other. I had to make my probe myself, however, and that may account for the lack of success in the one case.

DR. ANDREWS (closing the discussion): I am not opposed to doing anything necessary for the cure of these cases, no matter

how radical it may seem, but I do not approve of the removal of the middle turbinal on suspicion in every case where the sinus should be explored. The exploration of this sinus is so comparatively simple, that I feel I have sadly neglected a great many patients whom I have treated for what they called "post-nasal catarrh."

Severe Primary Hemorrhage After Removal of the Faucia Tonsil.

By O. J. STEIN, M. D.

To be published in full in a subsequent issue of THE LARYNGOSCOPE.

DISCUSSION.

DR. E. PYNCHON: I have on several occasions noticed that if a tonsil operation is done during the menstrual period, there is more soreness than at other times, so I advise against the operation at such times. Dr. Stein did not mention the application of a strong solution of nitrate of silver, 25 per cent. In those cases where there is oozing from the surface, nothing is more efficient.

DR. H. STOLTE, of Milwaukee: During the past year I have had much to do with hemorrhage from the tonsil. During that time I attended many Catholic Sisters who, I believe, because of their sedentary life, have tissues poor in vitality and blood vessels with insufficient contractile powers. I had so many cases of hemorrhage that I was afraid to operate any more in these cases. The first remedy to check the bleeding I use is a one per cent dioxogen ice water gargle. If the bleeding does not stop then, I arm an applicator with a big pledget of cotton, dip this in pure dioxogen and then press the instrument with force into the tonsil pocket, holding it there for two minutes. In about 90 per cent of all cases of severe hemorrhage, the hemorrhage stopped. If there is any oozing, I apply a strong nitrate of silver solution, using a moment when the bleeding surface is dry, instantaneously after having removed the cotton pledget. If both these remedies fail, I suture the arch, especially when there is arterial bleeding from the upper part. I use Yankauer's needles, and the suture is quickly made. The reaction is not great, there is only a little edema, and the bleeding is checked absolutely. In one case I made use of Dr. Pynchon's method of cautery dissection. It was more painful than a cutting operation, but there was no hemorrhage. In suitable cases I am going to resort now to the cautery method.

DR. O. T. FREER: Among local measures for the control of hemorrhage after tonsillotomy I have used the Mikulicz tonsil clamp with varying results. In some cases, presumably where the bleeding

vessels were in the bottom of the excavation left by the tonsil excision, it promptly controlled the hemorrhage. In other cases the bleeding continued, while the clamp was in place, and in others it returned as soon as the clamp was removed, so that it had to be worn for many hours. I have never seen injury from the Mikulicz clamp.

The advice is often given, under the supposition that the hemorrhage comes from visibly spurting vessels, to stop the bleeding by seizing them with long artery forceps. In practice I have had no success with this procedure for I have not been able to see definite jets of blood in the tonsillar wound, indicating the vessels to be seized. While such jets may have existed underneath the fluid and clotted blood which filled the niche from which the tonsil had been excised, the constant flow of blood hid them from view, so that instead of accurately grasping the bleeding points with the forceps, as in a wound upon the surface of the body, I blindly tried to seize them in the bottom of a well of blood, the proceeding being made more difficult by the retching of the patient. I not only hurt him a great deal, but aggravated the bleeding and inflicted injury which led to subsequent inflammation.

Of late, as an aid to local measures for the control of tonsillar hemorrhage, I have come to rely a good deal on general ones which withdraw the blood from the throat into other parts of the body or reduce the general blood pressure. The first of these general measures is the taking of deep inspirations by the patient while he stands. The upright position favors syncope, hence a lowering of the blood pressure, and the deep inhalations suck blood into the thorax as well as air, thus withdrawing it from the wounds in the throat and giving open vessels a chance to close. In two cases of tonsillar hemorrhage I have seen the bleeding checked by this simple measure alone.

The second general measure is the production of emesis. This is a well known remedy for controlling pulmonary hemorrhage and acts by lowering the blood pressure by weakening the force of the heart. Emesis is best induced by a hypodermic injection of one-tenth of a grain of apomorphine. I have repeatedly seen tonsillar hemorrhage cease spontaneously, when the patient vomited on account of blood he had swallowed.

The third general measure, to be used in cases of severe tonsillar hemorrhage, is the ligation of the extremities in order to confine the blood in them and to withdraw it from the general circulation.

I suggest a combination of the general measures suggested with local ones instead of the reliance on the latter only, which now seems to be the practice. Local applications are apt to be employed in rotation until the last one used, when the bleeding stops spontaneously because of approaching syncope due to the loss of blood, for the time being obtains the credit of being a most effective remedy for stopping tonsillar hemorrhage until used in the beginning of the next case it proves useless.

DR. J. C. BECK: The fact that during menstruation bleeding occurs more often and more profusely is so well known in surgery, that the surgeon will not operate, except in emergency cases, during this period. But there are other conditions that favor hemorrhage, such as cholemia, or, during cholelithiasis, where the blood is changed. Surgeons nowadays always examine into the coagulability of the blood. In a recent issue of the Johns Hopkins Bulletin, Williams and Shedon described a means for estimating the coagulability of the blood which is applicable in all cases. This method is very simple, and I have tried it in a number of instances, with good results. At the Presbyterian Hospital, much reliance is placed on this test, and it is carried out before every operative procedure. I have found that in most of my cases the coagulability of the blood is normal. I have not had a severe hemorrhage in a single case where the method was employed. If the coagulability is lessened, we will not operate, but administer a number of doses of calcium chloride so as to increase the coagulability of the blood. The patient will also be denied foods which increase the tendency to hemorrhage.

I have had hemorrhages and I always rely on the arterial forceps. One can see where most of the bleeding comes from, and one need only grasp the region of the tonsil and not the vessel to check the bleeding. The anterior pillar usually is the one to be grasped. The bleeding is checked in a few minutes. I consider the Mikulicz clamp an instrument of last resort. I have had marked infiltration follow its use, and considerable difficulty in swallowing and in the use of the voice.

DR. G. P. HEAD: I agree with Dr. Beck in regard to the use of the artery forceps. If it is an arterial hemorrhage, you can get perfect control at once by using a long artery forceps instead of waiting for clotting to take place. I want to call attention again to a general measure which I used successfully in the worst case of hemorrhage I ever had, and that is the hypodermic injection of

veratrum viride. The hemorrhage ceased immediately and I could not attribute the result to anything except the veratrum.

DR. H. M. THOMAS: I want to ask Dr. Stein whether he has tried ferropyrin for the control of primary hemorrhage after tonsillotomy?

DR. STEIN: I have not.

DR. THOMAS: It has been my custom for some time in cases of primary hemorrhage after tonsillotomy to use ferropyrin. The preparation consists of equal parts of chloride of iron and antipyrin. It is a most admirable styptic when applied in the dry form on a pledget of cotton.

DR. J. G. WILSON: Believing that the blood supply of the tonsil is definitely located, I see no reason why artery forceps cannot be applied effectively to check hemorrhage. In discussing hemorrhage from the tonsil, two things must be considered, first, the question of hemorrhage from the pillars of the fauces and plica triangularis, and, secondly, that from the tonsillar sinus. The exponents of the enucleation method necessarily cut very deeply and so easily pass through the fibrous sheath of the tonsil and injure the constrictor muscle. Thus they run great risk of severing the larger branches of the tonsillar artery. The location of the larger branches of the tonsillar artery is perfectly definite; they come from the main trunk at the middle of the tonsil, one branch passes upward and the other downward toward the poles of the tonsil. It is therefore possible with artery forceps to catch the tissue lying in this median area and so to arrest hemorrhage after the removal of the tonsil, be it a spouting artery or a general oozing. The blood supply of the anterior pillar and plica triangularis comes chiefly from the lingual; that of the posterior pillar comes chiefly from the descending pharyngeal. With this knowledge it is not difficult to apply forceps in such a way as to arrest hemorrhage in these areas.

DR. H. GRADLE: It has been my good fortune not to have seen any severe hemorrhages after tonsillotomy for a considerable time. I may perhaps attribute this to my plan of not removing the lower part of the tonsil, in which there are no crypts. Observation of patients after partial tonsillotomy has shown me that they do not seem to suffer any disadvantage from leaving this lower remnant, and since following this plan I have not had an alarming hemorrhage.

Another styptic not mentioned which I have used very much in hemorrhage, especially from the inferior turbinal, is a mixture of

dry tannin and a strong antipyrin solution. It is about the most rapid acting of the non-caustic astringents with which I am familiar.

DR. STEIN (closing the discussion): It is remarkable how long we can go without having a case of severe hemorrhage. I never had one as severe as this in the seventeen years I have done this work. My report was intended mainly to emphasize the importance of inquiring into this one causative factor, menstruation. We are all interested in hemorrhages, and we all have our favorite remedies. They are all good. I used nitrate of silver solution, in 33 per cent strength, in this case, but without result. I am fond of dioxogen or peroxide of hydrogen, and I use it and usually it is sufficiently styptic to stop in ordinary hemorrhage. I also employ deep breathing through the mouth or nose, if I am doing an adenectomy, although I never have my patients stand. I think there is considerable value in this method. As to the question of demonstrating the coagulability of the blood, I think it is of great value, but I doubt if many of us employ this test, particularly before operations on the tonsil. I do believe, however, that it would be a good plan to do so.

I am reminded by the discussion of a few cases reported by Moritz Schmidt, who speaks of severe prolonged hemorrhage following operations about the throat in patients who wore a tight collarband. Loosening the band immediately checked the hemorrhage. I demonstrated that once to my entire satisfaction.

As far as applying sutures and forceps to the bleeding point or particularly to the anterior pillar is concerned, I have often spoken of the use of the tenaculum, passing the instrument through the anterior and posterior pillars, giving it one twist, and holding it to the side of the mouth. That will usually check an ordinary hemorrhage. I did not have a tenaculum handy at the time when the bleeding occurred in the case reported, therefore I used the forceps.

The Use of Electrolysis for the Destruction of Dilated Veins of the External Nose and Septum. By O. T. FREER, M. D.

To be published in full in a subsequent issue of THE LARYNGOSCOPE.

DISCUSSION.

DR. H. STOLTE, of Milwaukee: I want to ask Dr. Freer whether he has used positive electrolysis on red noses due not to dilated blood vessels, but to a general redness from not visible capillaries, and whether he has used positive electrolysis on dilated arteries of the nose, and whether a hemorrhage would not result as soon as the artery is punctured?

DR. O. T. FREER (closing the discussion): I have not used the method for simple redness of the nose, nor have I had an opportunity to try the needle in the case of small dilated arteries, but the very minute puncture made could not produce hemorrhage of any consequence from them and the electric current would speedily stop any bleeding.

A Window Resected Septum. By J. C. BECK, M. D.

DR. BECK presented a specimen taken from a patient who died from pneumonia two and a half years after a submucous resection had been done. The specimen shows that there is no regeneration in the septum of either bone or cartilage, but merely a formation of dense fibrous tissue with complete restoration of the mucous membrane. The patient was 35 years of age when operated on.

Inspection of School Children with Special Reference to the Ear, Nose and Throat. CHAS. WYCHE, (St. Louis). *St. Louis Med. Rev.*, May 4, 1907.

The author urges the importance of an early otological examination, and mentions as requiring special attention, enlarged tonsils, irregularities of the septum, hypertrophic and atrophic rhinitis, and, above all, to adenoids.

Eye examinations in the public schools have attracted the attention of the public, which attaches a lack of importance to otology, and is due to ignorance on the part of the parents and to some extent on the part of teachers. Each pupil, irrespective of what the teacher thinks, or the pupil may feel in regard to his condition, should be carefully examined. A card system recording the condition obtaining should be kept.

Notification in case treatment is necessary should be sent to parents at once, and this would relieve the teacher of all responsibility as to future complications. That a teacher who has the same pupils under him or her for months will readily acquiesce in the physician's demands for treatment is a foregone conclusion. Much more difficult will be the training of parents, there being a popular prejudice in the minds of well-to-do parents that only children of the poor are hampered by ailments undiscovered by parents and guardians.

It will be noticed that the author's views are, in essentials, those carried out by the system of Dr. Frank Allport of Chicago, and now compulsory by law in several states.

EATON.

BOOK REVIEWS.

The Diseases of the Nose and Its Accessory Sinuses.

By H. LAMBERT LACK, M. D., (Lond.), F. R. C. S. Royal 8vo., 399 pages, with 124 illustrations. Price 25s. Publishers, Longmans, Green & Company, 39 Paternoster Row, London, New York and Bombay.

In 1899 the author was awarded the Jacksonian Prize for an Essay on "The Pathology, Diagnosis, and Treatment of the Inflammatory Affections of the Nose and Its Accessory Sinuses and Air Cells." This essay, revised and amplified, furnishes the nucleus of the present volume.

What impresses the reviewer as the most distinctive feature of this book is its originality. As an expert pathologist the author is especially well qualified to present the pathology of the various neoplasms and diseases in Rhinology, and this he has done in a lucid and concise manner, supplementing the text by illustrations of microscopic sections and macroscopic specimens.

Of operative technique he presents the most acceptable and most recent methods and seems to have given due credit to all that may be of definite practical value.

Treatment is given much prominence in this volume and we cannot but admire the terse and definite suggestions laid down in these paragraphs. All in all, it is one of the most "meaty" treatises of modern productions in Rhinology.

M. A. G.

Practical Dietetics with Refrence to Diet in Disease.

By ALIDA FRANCES PATTEE, Graduate, Boston Normal School of Household Arts; late Instructor in Dietetics, Bellevue Training School for Nurses, Bellevue Hospital, New York City; Special Lecturer at Bellevue, Mount Sinai, Hahnemann, and the Flower Hospital Training Schools for Nurses, New York City, St. Vincent de Paul Hospital, Brockville, Ontario, Canada. Fourth Edition. 12 mo., cloth; 300 pages. Price \$1.00 net; by mail, \$1.10; C. O. D., \$1.25. A. F. Pattee, Publisher, 52 West 39th Street, New York.

The rapid appearance of the second, third and fourth edition of this volume is an indication of the appreciation which a good, practical book receives at the hands of the medical and nursing profession.

It presents in small compass recipes for the preparation of the various foods, liquid, semi-liquid and solid; the proper dietary for the different diseases, and for conditions requiring special feeding as pregnancy; and the diet for infants and young children. Suggestions for the nurse in the sick room are added with convenient information as to the ordinary measures and their equivalents, and the preparation of percentage solutions.

Two indices in the back of the book, one to recipes and one to diseases make reference to the special chapters easy and add much to the value of the book. Based as it is upon long personal experience, and upon the best authorities on diet, the book can be recommended to practitioners, students and nurses.

Diseases of the Rectum, Their Consequences and Non-Surgical Treatment.

By W. C. BRINKERHOFF, M. D. 12mo.; 200 pages. Price, \$2.00. Orban Pub. Co., 17-21 E. Van Buren St., Chicago.

While it is not usual to present a book on this subject to that portion of the profession whose special field is the upper respiratory tract, the well-known reflex relationship between the rectum and the nose and throat should make no excuse necessary.

The book is a protest against the application of surgery to rectal diseases where the condition will yield to less radical measures. It also aims to direct the physician's attention to the rectum as the possible seat of trouble to account for symptoms in remote regions.

Plaster of Paris and How to Use It.

By MARTIN W. WARE, M. D., Adjunct Attending Surgeon, Mount Sinai Hospital; Surgeon to the Good Samaritan Dispensary; Instructor in Surgery, N. Y. Post Graduate Medical School. Cloth, 12mo.; 72 Illustrations, about 100 pages. Price, \$1.00. Surgery Pub. Co., 92 William St., New York City.

This book is a complete treatise on the use of plaster of paris as applied to surgery and brings into convenient form information which is rarely treated practically and completely in text books of surgery and orthopaedics.

While the subject is of more interest to the general surgeon, the technique of making plaster casts can be easily applied to deformities of the nose and ear. A chapter of plaster of Paris work in mouth surgery is also included.

A Non-Surgical Treatise on Diseases of the Prostate Gland and Adnexa.

By GEORGE WHITEFIELD OVERALL, A. B., M. D., Chicago. Cloth, 12mo.; 227 pages, 26 Illustrations. Rowe Publishing Company.

The various pathological conditions of the prostate are considered and illustrative clinical cases are reported. Three chapters are devoted to the therapeutic action of electricity, electrolysis, cataphoresis and high frequency current.

The World's Anatomists, Concise Biographies of Anatomic Masters from 300 B. C. to the Present time, Whose Names Have Adorned the Literature of the Medical Profession.

By G. W. H. KEMPER, M. D., Professor of the History of Medicine in the Medical College of Indiana, Indianapolis, Indiana. 11 Illustrations (9 Portraits). Price 50 cents. Publishers, P. Blakiston's Son & Co., 1012 Walnut St., Philadelphia, Pa.

A very handy little book which tells of most of the names that vexed the young student of anatomy, and some others. Many of the illustrations are from famous portraits.

Surgery of the Nose (Zur Chirurgie der Nase).

By LUDWIG LOWE of Berlin. In two volumes, 4to.; Vol. I., 40 pages, with 11 inserts and 11 illustrations in the text. Price 10 marks. Vol. II,

BOOK REVIEWS.

103 pages, with 9 inserts and two illustrations in the text. Price 15 marks. Publisher, Oscar Coblentz, Berlin.

The author has undertaken to present the radical surgery of the nose from the view-point of exposing the affected area and penetrating the depth of the nasal fossa by way of the face and of the mouth.

The subject matter is presented in two large folios of 100 pages and twenty well-executed plates, and from a literary and typographical point of view is a very artistic and creditable production.

As reviewer and rhinologist, however, we must protest most emphatically against this astounding and violent radicalism in nasal surgery. Even the most radically inclined among us must admit that a "decortication of the face" is an unnecessarily severe operative procedure for correction of septal deviations or ablation of the turbinals or even freely exposing the maxillary antrum. This tendency to extreme radicalism must have its limitations. M. A. G.

Atlas of Special Surgery (Grundriss und Atlas der Speziellen Chirurgie).

By Prof. Dr. GEORG SULTON. Part I. Forty colored plates, 218 figures, 460 pages. (Lehmann's Medizin. Handatlas, Vol. XXXVI.) Price, 16 marks (\$4.00). Publishers, J. F. Lehmann, Munich. 1907.

This volume of the well-known Lehmann Atlas Series is of special interest and value to the laryngologist and otologist, in as much as it presents the surgery of the brain and cranium, face, nose and accessory areas, the mouth, tongue and palate, tonsils, ear, neck and thyroid, larynx and trachea, and beyond the mediastinum into the thoracic cavity.

It is remarkable how much genuine merit has been put into these Atlases, and the illustrations of head and neck surgery and terse descriptions of technique are very satisfactory. M. A. G.

Diseases of the Throat, the Larynx, the Ear and the Nose. (Maladies de la Gorge, du Larynx, des Oreilles et du Nez.)

By E. J. MOURE, Prof. Adjoint a la Faculté de Médecine de Bordeaux, and A. Brindel, Aide de Clinique a la Faculté de Médecine de Bordeaux. 8vo., 700 pages, with 358 figures, some colored. Price, 9 francs. Publisher, Octave Doin, 8 Place de L'Odeon, Paris.

By the many valuable contributions, both of a practical and scientific nature which our able confrere of Bordeaux has made to Oto-Laryngology, he, together with his efficient aid, has prepared a firm foundation on which to build a more voluminous superstructure.

The volume just published is intended as a practical guide to the surgery of the Throat, Larynx, Ear and Nose, and it is a veritable epitome of valuable suggestions and practical hints, and contains more descriptive matter and original illustrations of operative technique and surgical treatment than any work devoted to this field with which we are familiar.

If we may be permitted the criticism, we would suggest that in subsequent editions of this valuable book the authors may deem it wise to improve the quality of the paper and binding, so that the excellence of the illustrations and the text may be given full prominence. M. A. G.

History of Otology. (Geschichte per Ohrenheilkunde.)

By Professor Dr. ADAM POLITZER. In two volumes. Vol. I, from the earliest beginning to the middle of the nineteenth century. Large 8vo., 467 pages, with 31 inserts and 19 illustrations in the text. Price: paper

bound, 20 marks; cloth bound, 22 marks. Publisher, Ferdinand Enke, Stuttgart.

Like all arts and sciences, Otology has its history, and like all toilers in an art or science, it is well that we should know something of the historical development of the field in which we work.

From whom could we expect a more polished, more complete and more delightfully presented history of Otology than from our esteemed and venerable teacher, the ever active and resourceful Professor Politzer, the grand Nestor of modern Otology.

With infinite pains and valuable collaboration he has collected, in a formidable-looking volume of 470 pages, the data referring to the development of Otology from its earliest empirical epochs to the second half of the nineteenth century.

He gives us, in these many pages, realistic pen-pictures of the slow evolution of Otology, the seeking of knowledge and for light, the difficulties encountered by the early anatomists, the evolutions and revolutions of early theories of otological science.

This book contains the works, labors and accomplishments of masters evolved from a scientific chaos and tangle, which has cost many hours of reading and of labor.

This is but volume one of Politzer's splendid undertaking. *Die Geschichte der Ohrenheilkunde.*
M. A. G.

The Labyrinth of Animals, Including Mammals, Birds, Reptiles and Amphibians.

By ALBERT A. GRAY, M. D. (Glas.), F. R. S. E., Surgeon for Diseases of the Ear to the Victoria Infirmary, Glasgow. Vol. I, 198 pages, 31 plates. Price, 21 Sh. net. Publishers, Messrs. J. & A. Churchill, 7 Great Marlborough St., London, W.

Not since the unusually complete investigations of Gustaf Retzius, in 1884, "*Das Gehörorgan der Wirbelthiere*" has an attempt been made to collect, systematize and present in tangible form the labyrinthian array of anatomy of the labyrinth as is undertaken and accomplished in such splendid form by Doctor Gray in this volume.

With the exception of fishes, the author has presented the anatomy of the labyrinth of all vertebrates, a stupendous work, when we pause to consider that many generations of anatomists have succeeded in building up only composite pictures from observations made upon small fragments, sections, and casts of the labyrinth.

This volume has an unusually valuable scientific significance, for it creates standards of comparison for the use of the student of comparative anatomy, and for the scientific workers in Otology.

The early chapters contain descriptions of the methods of preparation of the delicate structures of the membranous labyrinth, methods of photographing same for record, and for stereoscopic illustration.

The 31 plates are exact photographic reproductions of the specimens prepared by the author, and it is the most beautiful work of the kind that we have ever seen. To facilitate the study of these pictures a small hand-stereoscope accompanies the volume. It is intended that the work shall be complete in two volumes, but should important new material arrive during publication, the author states that it may be necessary to bring out a small supplementary volume.

Doctor Gray deserves the praise and commendation of all scientific workers and especially of the thinking, discerning Otologist, to whom the results of the many years of labor involved in the preparation of this work may offer much knowledge of pathological conditions, and may, perhaps, be an incentive to suggestions and means of relief for deafness, tinnitus, and vertigo, conditions which have thus far baffled us from every direction.

M. A. G.

SELECTED ABSTRACTS.

When shall we advise Tympano-Mastoid Exenteration, in the Treatment of Suppurative Otitis Media, and in what Percentage of Cases may we Expect a Cure. H. O. REIK, M.D., Associate in Ophthalmology and Otology, Johns Hopkins University.

The author reviewed the improvements which have taken place in the treatment of Aural disease and expressed the belief that it is our duty to teach the family physician and the public to recognize the fact that purulent otorrhoea is a symptom of a disease which has a most important bearing upon the patient's continued enjoyment of health and life; that it demands immediate and continuous treatment until a cure results, inasmuch as it is susceptible of cure in almost every instance and, that while we sometimes speak of that measure which is employed as a last resort in the treatment as "a radical operation," it is not *radicalism*, but *conservatism*, which demands surgical intervention in chronic suppurative otitis media when other means of treatment have failed of effect. The author, after considering in detail the various methods of treating the disease in accordance with its varying pathological changes in each case, expressed the opinion that if careful attention be given to all of these details, only a small minority of all the cases of chronic otorrhoea would ever require the operation of tympano-mastoid exenteration.

* Regarding the small number of cases, he asked the following questions: (1) What are the indications that justify tympano-mastoid exenteration? (2) What are the dangers and risks of the operation as compared with the disease untreated? (3) What may we safely say to the patient regarding relief from the otorrhoea and the restoration of function?

Each of these questions was considered in full and the following conclusions drawn: .

1. Broadly speaking, practically every case of suppurative otitis media is assumed to be susceptible of cure by one means or another.

2. Every case of chronic suppurative otitis media, without symptoms of intracranial invasion, should be treated patiently and per-

sistently for a reasonable length of time, but not indefinitely, by well directed efforts at a cleanliness and anti-sepsis through the external auditory canal. When it becomes evident that these simple measures or minor operations cannot cure the disease, tympano-mastoid exenteration should be advised unless in a given case there exists some special reason of a socio-economic character that justifies delay and the risks of the disease.

3. The clinical evidences of an inveterate purulency that may help one to decide the question of when to recommend operation, are the finding of cholesteatomatous masses, epithelial cells or bone dust in the washings from the middle ear, the tracing of the source of pus to the mastoid antrum or labyrinthine capsule, or the existence of granulomata springing from various areas of the tympanic wall which cannot be directly inspected and treated.

4. The possible dangers of the operation are believed to be far less than those of the disease.

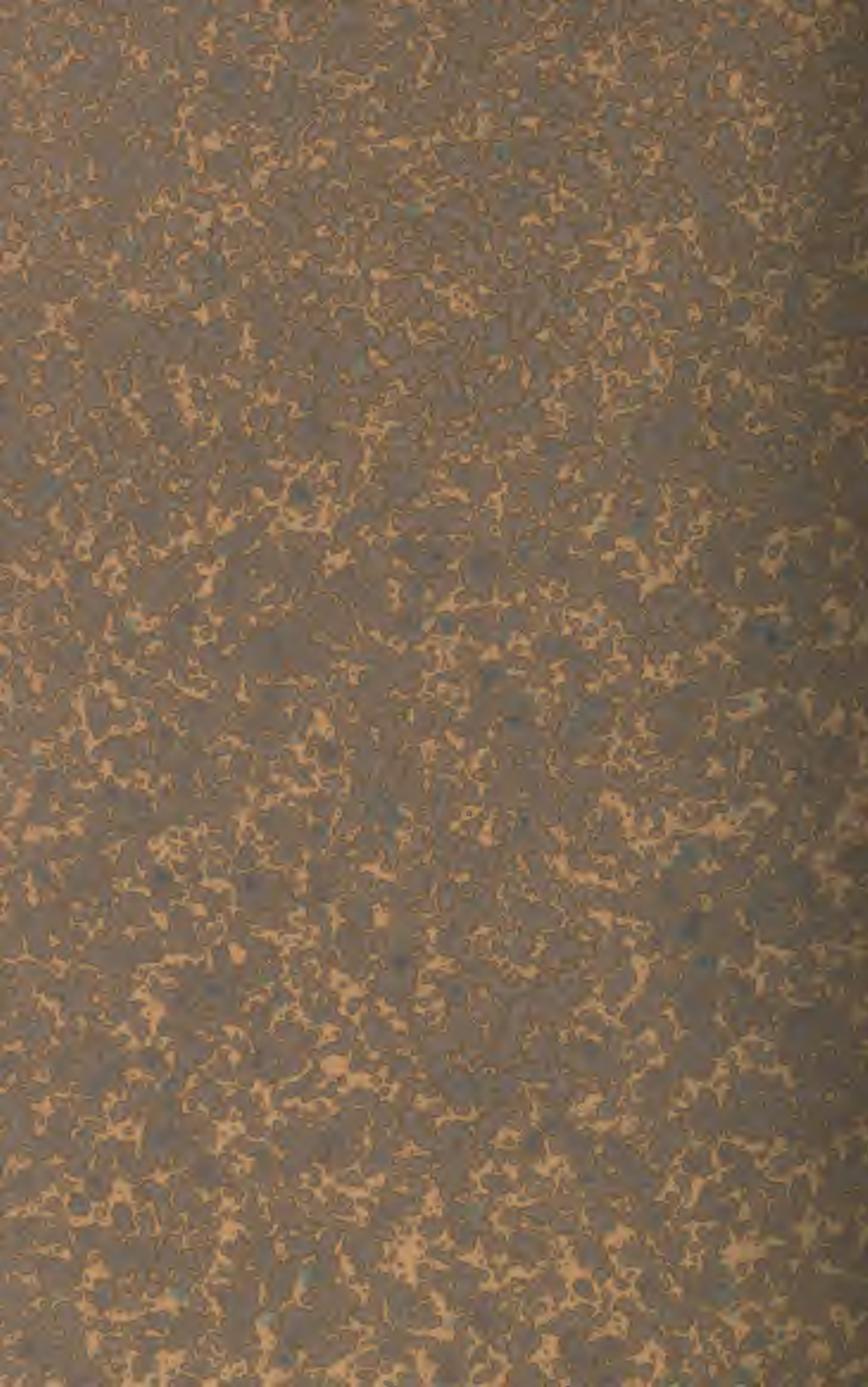
5. The patient should be told that not every case is curable, even by an operation (the percentage of cures in the obstinately chronic cases probably approximating 70%), that the hearing power will probably not be improved, and may be somewhat impaired, but, that the serious nature of his disease warrants surgical intervention as a prophylactic measure.

6. Every patient upon whom an operation of typano-mastoid exenteration is contemplated should be most carefully studied for a considerable period of time, in order that the slightest evidence of latent meningitis or purulent labyrinthitis may be detected, and when there exists any reason to suppose that the disease has extended beyond the bounds of the tympanic cavity, the patient or his guardians should be told that an element of danger attends the operation. The possibility of post-operative complications cannot be ignored, and the surgeon must safe-guard himself.

Periodic Autumnal Catarrh; Vaso-Motor Coryza; The So-Called Hay-Asthma. C. C. MAPEC. *The Medical Age*, Sept., 1905.

The writer gives a resumé of the various theories advanced by various authors as to the cause and treatment of this affection.

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